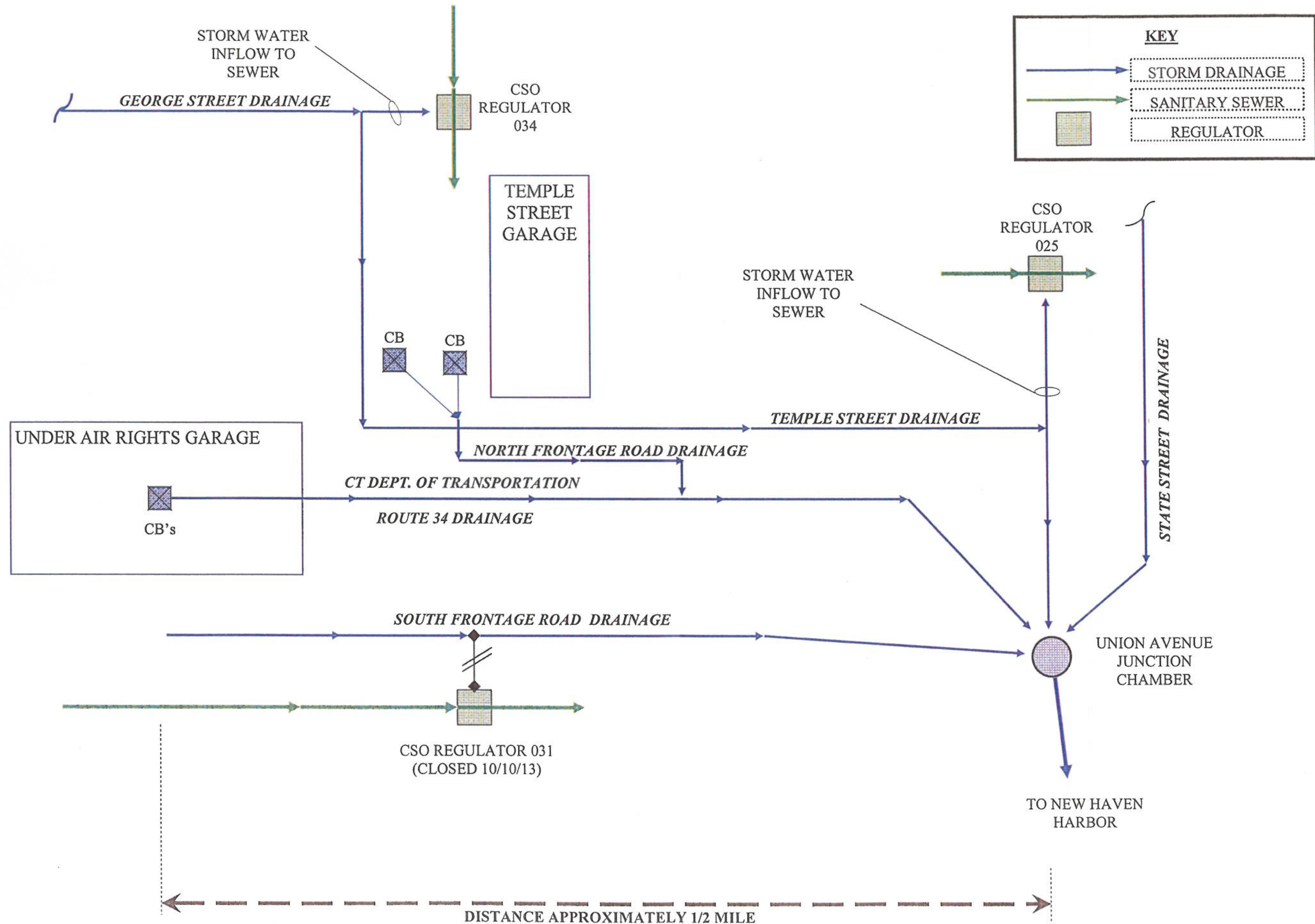
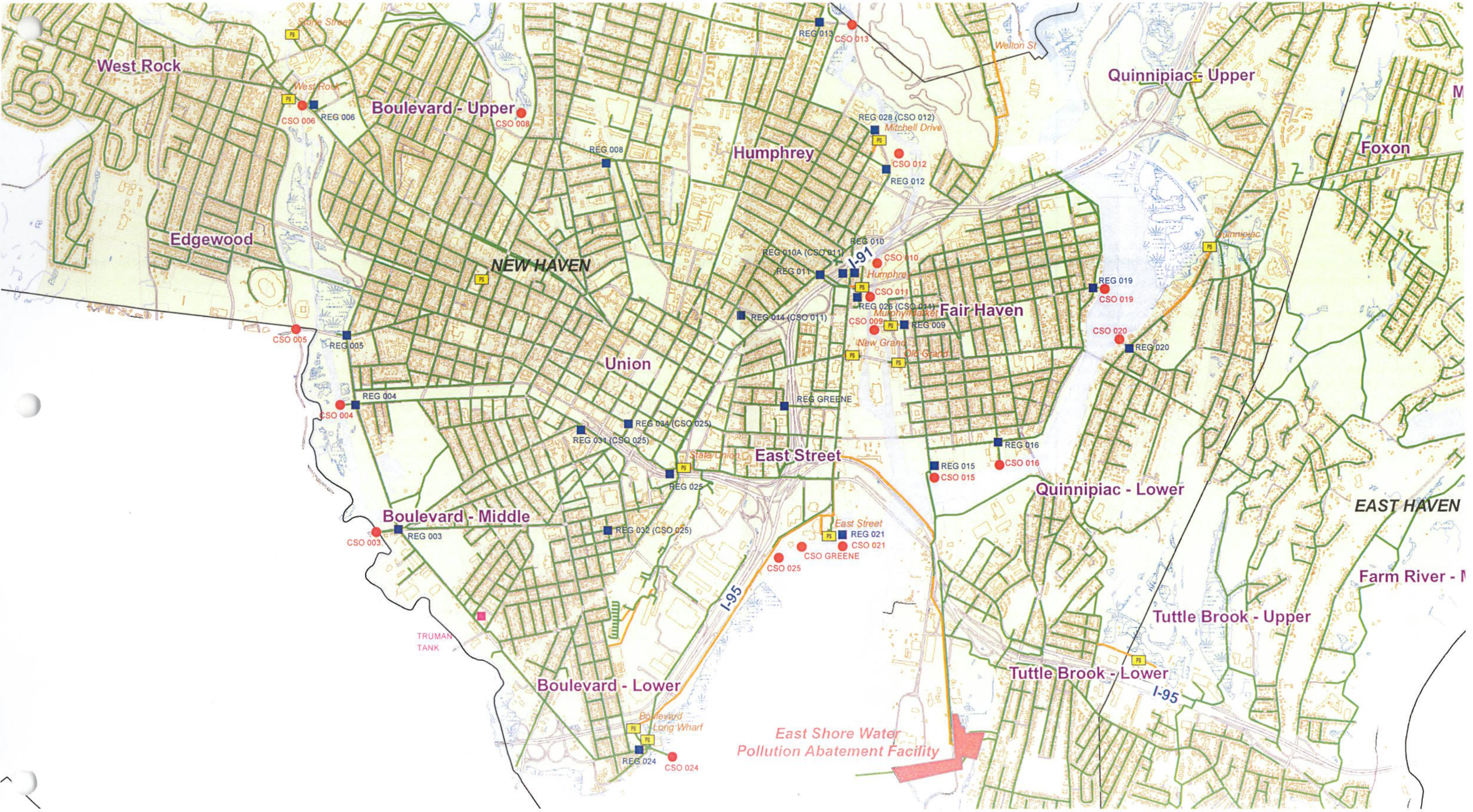


OVERVIEW

CITY OF NEW HAVEN DRAINAGE SCHEMATIC



ATTACHMENT 1



2

ATTACHMENT 2



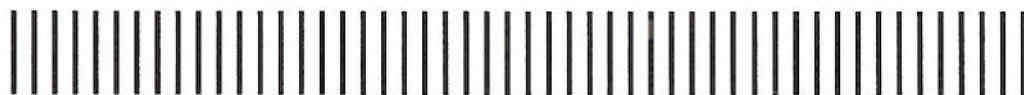
Greater New Haven Water Pollution Control Authority

260 East Street • New Haven CT 06511

Wastewater Treatment System

Performance Evaluation Report

December 2011



Report Prepared By:

**Malcolm Pirnie, The Water Division of
ARCADIS**

44 South Broadway, 15th Floor
White Plains, NY 10602



The Water Division of ARCADIS

containing 5 dry pit submersible pumps, and a biochemical odor control unit. The station also had a portable bypass pump on site during our visit.

The 5 dry pit submersible pumps at the pump station have had several maintenance and operating issues including seal and bearing failures since the pump stations inception. In June 2011, GNHWPCA entered a Professional Services Agreement with Malcolm Pirnie, Inc. to conduct an evaluation of influent channel and pumping system alternatives at the pump station to determine potential solutions for the ongoing pump issues.

During our inspection, there were no reported or observed operation or maintenance issues at the pump station. GNHWPCA reported that the pump station wet well ultrasonic level sensors were not online during our visit; however, the units have since been replaced with a pressure transducer.

Recommendations

The following are recommendations for the Morris Cove Pump Station based on our site visit observations:

- Complete evaluation of influent channel and pumping system alternatives.
- Continue to monitor and maintain the pumps and other equipment.

Risk Rating

In general, we observed the Morris Cove Pump Station to be well-maintained and in good operating condition, with the exception of the ongoing pump issues. Based on our observations, the pump station received a risk rating of 3 (some risk) as the deficiencies observed do not pose an immediate threat and the pump station's equipment is adequately redundant.

2.2.1.4. State and Union Pump Station

The State and Union Street Pump Station is an older pump station located in downtown New Haven. The pump station has a design capacity of 10,417 gpm and pumps flows from New Haven into a gravity sewer which leads to the East Street Pump Station. The pump station consists of pump/control building that houses the pump station controls, a dry pit with 4 vertical centrifugal pumps, and a wet well. There is no emergency power at the pump station.

OMI reported that the 4 vertical centrifugal pumps were in good operating condition. The pumps are all older and none of the pumps were operating during our visit. Pump No. 1 is no longer used due to inadequate capacity. New protective guarding was observed on the moving parts on all 4 pumps.

New maintenance valves were installed in the pump discharge piping for use in removing settled grit. Pump No. 3 had a new discharge isolation valve. Pump No. 2 had a leaking check valve. We observed some surface rust on the discharge piping and valves at all 4 pumps.

The pump station recently received a new control panel and communications equipment. OMI also reported that the wet well had been recently cleaned reducing the occurrence of pump clogging.

Recommendations

The following are recommendations for the State and Union Street Pump Station based on our site visit observations:

- Repair leaking check valve at Pump No. 2.
- Renovate pump station as part of a future project.

Risk Rating

In general, we observed the State and Union Street Pump Station to be satisfactorily maintained and in fair operating condition. Based on our observations, the pump station received a risk rating of 3 (some risk) as the deficiencies observed do not pose an immediate threat and/or equipment failure generally would not have significant consequences. However, due to the older equipment, the pump station should be considered for upgrades in the future.

2.2.2. Medium Pump Stations

The GNHWPCA owns a total of 6 medium pump stations with design capacities ranging from 1,200 to 5,000 gpm throughout New Haven and the surrounding communities. The medium pump stations are configured as either wet wells with submersible pumps (3 total) or wet pit – dry pits with vertical centrifugal or submersible pumps (3 total). The following is a list of the medium pump stations and their configuration.

**Table 2-1:
Medium Pump Stations**

Wet Well with Submersible Pumps	Wet Pit - Dry Pit with Vertical Centrifugal or Submersible Pumps
Barnes Avenue Long Wharf Quinnipiac	Fairview Road State Street Welton Street

TABLE 3-4
Boulevard Pump Station Improvements

Unit Process	Improvements
Fine Screening	<ul style="list-style-type: none"> • Demolish
Coarse Screening	<ul style="list-style-type: none"> • Replace two existing, two-stage screens with three, single-stage climber type bar screens • Provide screenings presses to compact the screenings and convey the compacted screenings to a dumpster in the garage.
Grit Removal	<ul style="list-style-type: none"> • Demolish existing grit removal system (Hydraulic analyses show that hydraulic efficiency will be improved at the pump station increasing pumping capacity) • Biotower followed by activated carbon

For additional information on structural, architectural, building services, electrical and odor control improvements, refer to Appendix F.

3.4 Union Street Pump Station

Capacity increases at the existing Union Street pump station are not practical or cost-effective. The existing pump station is located partially below a building and an overpass, adjacent to rail road tracks and is inaccessible for cost effective construction. Hydraulic capacity restrictions on the inlet side of the pump station limit the hydraulic throughput of the pump station to well below what the existing sewer system can convey to the pump station. Pump station hydraulic restrictions include the sewer from the street leading to the screen channels and the wet well size and configuration. In addition the need for a pipe bridge over the rail road tracks to discharge flow to the existing force main, the lack of space to locate a standby generator, and the proximity to commercial neighbors further supports the siting of a new pump station on an alternate site.

Six new sites were considered for the new location of the Union Street pump station. Table 3-5 summarizes the six locations considered.

TABLE 3-5
Proposed Locations of Union Street Pump Station

	Location	Advantages and Disadvantage
Alternative 1	Corner of State Street and Frontage Road	<ul style="list-style-type: none"> • Site Size: 8,600 square feet • Distance from existing pump station is 170 feet • Site is unavailable • 506 linear feet (LF) of new sewers are required
Alternative 2	Corner of Union Avenue and Oak Street Connector	<ul style="list-style-type: none"> • Site Size: 2,700 square feet • Distance from existing pump station is 230 feet • Site is available • 661 LF of new sewers are required • Located next to the rail road track
Alternative 3	Corner of Olive Street and Fair Street	<ul style="list-style-type: none"> • Site Size: 11,000 square feet • Distance from existing pump station is 775 feet • Site is available

TABLE 3-5
Proposed Locations of Union Street Pump Station

	Location	Advantages and Disadvantage
		<ul style="list-style-type: none"> • 1,617 LF of new sewers are required • Vacant lot
Alternative 4	Corner of Union Avenue and South Frontage Road	<ul style="list-style-type: none"> • 8,400 square feet • Distance from existing pump station is 325 feet • Site is available • 896 LF of new sewers are required • Location is the parking facility for the Police Station
Alternative 5	Corner of State Street and Fair Street	<ul style="list-style-type: none"> • 14,800 square feet • Distance from existing pump station is 380 feet • Site is available • 1,407 LF of new sewers are required • Commercial parking facility
Alternative 6	South of Heath Drive-US Postal Service	<ul style="list-style-type: none"> • 10,100 square feet • Distance from existing pump station is 715 feet • Site is available • 1,504 LF of new sewers are required • Part of US Postal Service parking facility

Several factors were evaluated to select the preferred location for the Union Street pump station. In particular, site characteristic (size, topography and underground utilities), constructability, availability of the lot for purchase, and impact on surrounding businesses were consider. Further investigation will be required to evaluate the impacts of contaminated soil, buried obstructions and other construction projects in the area. However when the evaluated factors were considered, Alternative 6 was selected. Attributes of the Alternative 6 site are summarized in Table 3-6.

TABLE 3-6
Union Street Site Selection

Siting Criteria	Advantage
Land Availability	Post Office Site
Topography	Flat
Vicinity to neighbors	Isolated in an industrial area
Site Size	Adequate for construction and future operation & maintenance

To integrate the new Union Street pump station into the collection system, new sewers and force main lines will need to be constructed. A combination of open cut and trenchless technologies will be employed to construct the new sewer and force mains necessary to connect the new pump station to the existing infrastructure. A gravity sewer from the intersection of Frontage Road and State Street along the southern side of the Oak Street Connector and under the rail yard will convey influent to the new pump station. A force main beneath the Oak Street connector will convey the pumped flow to the existing force main in Water Street. Figure 3-1 illustrates the sewer improvements and the proposed location for site Alternative 6.

The new Union Street pump station will be nominally 5,100 square feet. Dry weather flow will be pumped to the existing force main which will convey the flow to East Street pump

station. Wet weather flow will be pumped through a new force main to the harbor crossing. The alignment of the new force main is along Water Street. A pipe corridor has been set aside along Water Street for this purpose. The second barrel of the existing twin 42-inch-diameter pipes will be used to cross the harbor. A new force main will convey the wet weather flow from the harbor crossing to the East Shore WPAF. The process configuration of the Union Street pump station is shown in Figure 3-2. The process configuration is similar to East Street and Boulevard pump stations. A design summary of the major pump station components is presented in Table 3-7.

TABLE 3-7
Union Street Pump Station

Unit Process	Improvements
Coarse Screening	<ul style="list-style-type: none"> • Three, single-stage climber type bar screens • Screenings presses to compact the screenings and convey the compacted screenings to a dumpster
Dry Weather Pumping	<ul style="list-style-type: none"> • Three @ 2.6 mgd each (30 hp) • VFD for capacity control
Wet Weather Pumping	<ul style="list-style-type: none"> • Three @ 28.5 mgd each (900 hp) • VFD for capacity control
Odor Control	<ul style="list-style-type: none"> • Two trains, 5,500 cfm each • Biotower followed by activated carbon

3.4.1 Odor Control

The total odorous air load to be treated at the Union Street pump station is estimated at 10,500 cfm based on collecting odorous air from equipment enclosures, below covered channels, material storage and loading areas and wet wells. This equates to approximately 20 air changes per hour (ACH) for these spaces.

A building heating, ventilation, and air conditioning (HVAC) system will provide ventilation to the room spaces at 12 ACH, meeting National Fire Protection Association (NFPA) guidance. The HVAC system will maintain the rooms at a positive pressure relative to the odorous spaces being vented to help maintain positive odor capture. The odorous air system will collect the most odorous portions of this air through the contained equipment and covered channels and vent it to an odor control system. The building HVAC air not used as supply air for the odor control system will be vented to the atmosphere.

Table 3-8 summarizes the design criteria for the odor control system for the Union Street pump station.

TABLE 3-8
Odor Control System Major Equipment List and Design Criteria

Component	Design Guidance and Criteria
Biotower	<p>Two 8-foot-diameter units</p> <p>99% removal H₂S</p> <p>5,500 cfm per train</p> <p>Minimum empty bed contact time 10 seconds</p> <p>Maximum pressure loss at rated flow 5 inches</p>

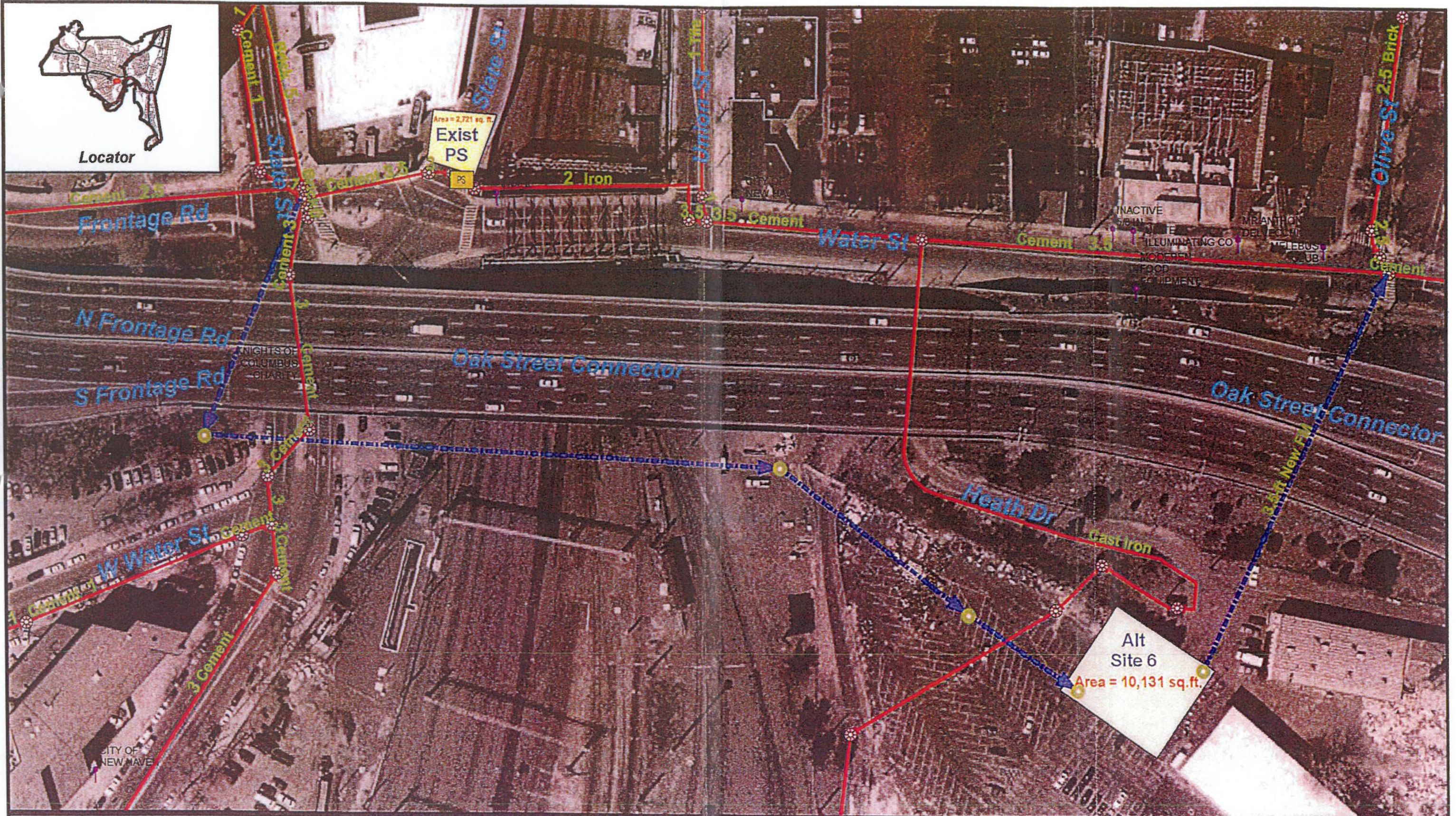
TABLE 3-8
Odor Control System Major Equipment List and Design Criteria

Component	Design Guidance and Criteria
Carbon	<p>Two 6-foot-diameter dual bed units. (Annular flow units may be considered during design phase; (the number of units may also be considered during design phase)</p> <p>Maximum superficial velocity 50 feet per minute</p> <p>3-foot carbon beds</p> <p>High capacity carbon 0.3 grams H₂S per cc carbon</p>
Odorous Air Fans	<p>1 fan per train (2 fans total)</p> <p>Squirrel cage style FRP</p> <p>20 hp Variable Speed (VFD drives)</p> <p>Dedicated fans rated at 5500 cfm for 12 inches w.c.</p>

A portion of the collection system will only be operational during wet weather events. To prevent odors during periods of only dry weather flow wet weather force mains will be drained or their use alternated with dry weather force mains.



Locator



Source of GIS Data - City of New Haven, CT

Union Street Alt Site 6

0 25 50 100 150 200
Feet

- Sanitary Manhole
- Proposed_Manholes
- Sanitary Line
- Proposed_Sewers

FIGURE 3-1
GNHWPCA
FACILITY PLAN
UNION STREET PUMP STATION SITE LOCATION

CH2MHILL

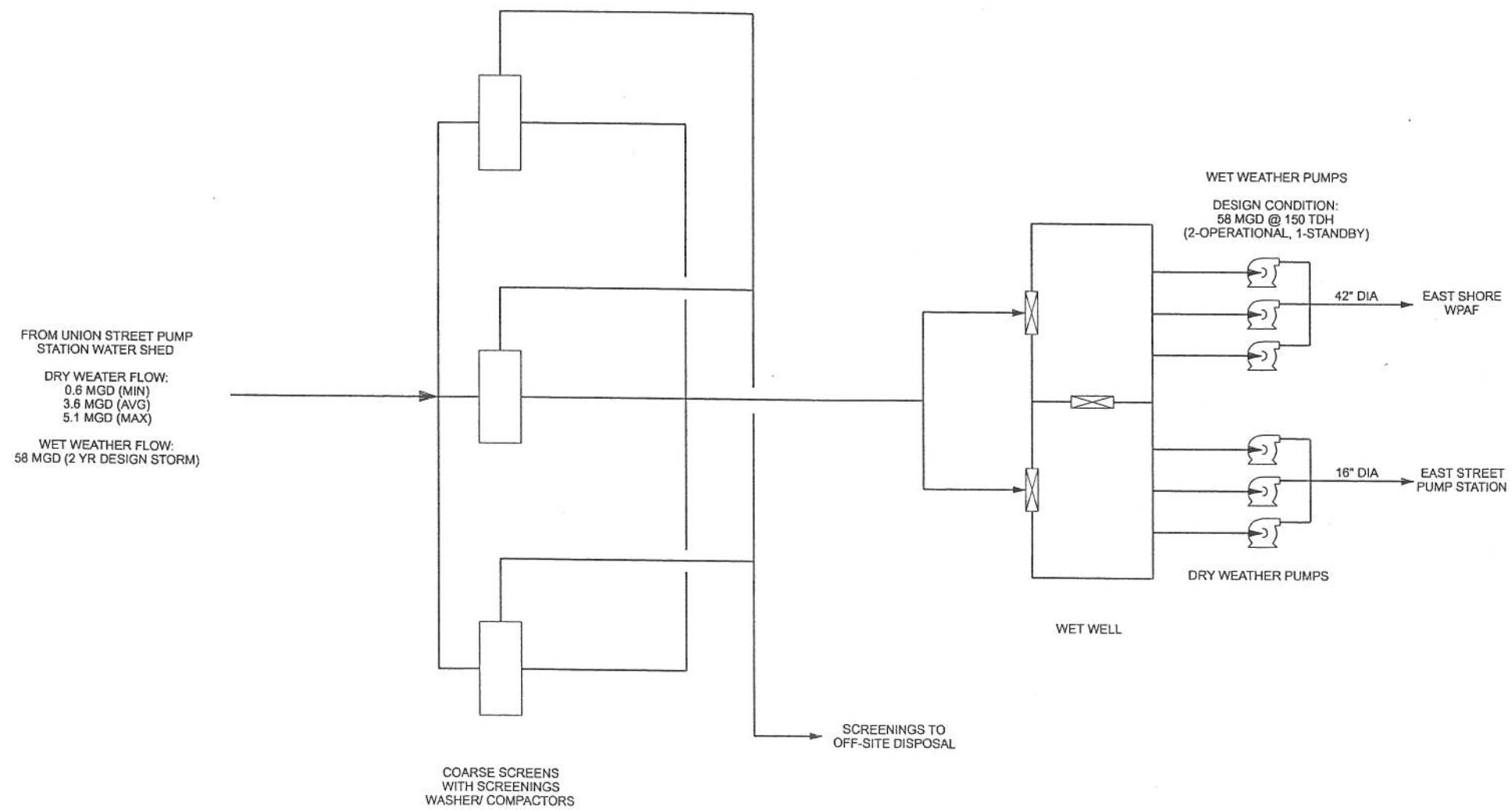


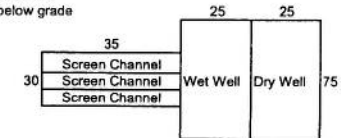
FIGURE 3-2
GNHWPCA
FACILITY PLAN
UNION STREET PUMP STATION PROCESS FLOW DIAGRAM



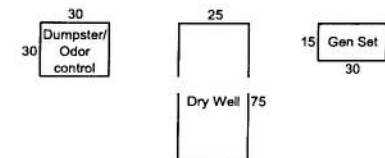
Project: GNHWPCA Facilities Plan
Facility: Union Pump Station
Estimate Type: Conceptual - Capital Improvements Planning
Prepared By: M Moore/WDC
Date: 9/27/2010

Item of Work	Qty	Unit	Unit Cost	Total Cost	Comments
Division 1 - General Requirements					
Included in percentages below					
Div. 1 Subtotal:				\$0	
Division 2 - Site Work					
Yard Piping					
Gravity Sewer (48" dia)	250	LF	\$1,000	\$250,000	estimator judgement
Microtunneling (under rail road tracks)	450	LF	\$3,400	\$1,530,000	estimator judgement
Microtunneling (under high way)	400	LF	\$3,400	\$1,360,000	estimator judgement
Piling	2,400	VLF	\$85	\$204,000	100 ton piles, 10' o/c spacing, 30' long
Site Work	1	Allowance	\$100,000	\$100,000	Estimator's judgment
Div. 2 Subtotal:				\$3,444,000	
Division 3 - Concrete					
Stone Base 6" thick	89	CY	\$25	\$2,222	
Building Foundation	533	CY	\$500	\$266,667	
Below Grade Walls	1,210	CY	\$750	\$907,500	
Elevated Slab	356	CY	\$1,000	\$355,556	
Odor Control and Dumpster Slab	33	CY	\$200	\$6,667	
Emergency Generator Slab	17	CY	\$200	\$3,333	
Div. 3 Subtotal:				\$1,539,722	
Division 4 - Masonry					
Not used				\$0	
Div. 4 Subtotal:				\$0	
Division 5 - Metals					
Included in percentages below				\$0	
Div. 5 Subtotal:				\$0	
Division 6 - Wood & Plastics					
Not used				\$0	
Div. 6 Subtotal:				\$0	
Division 7 - Thermal & Moisture Protection					
Included in Division 10				\$0	
Div. 7 Subtotal:				\$0	
Division 8 - Doors & Windows					
Included in Division 10				\$0	
Div. 8 Subtotal:				\$0	
Division 9 - Finishes					
Included in percentages below				\$0	
Div. 9 Subtotal:				\$0	

Below Grade
33' below grade



Above Grade



Division 10 - Specialties

Dry Well Superstructure	1,875	SF	\$250	\$468,750
Screenings Superstructure	1,050	SF	\$250	\$262,500
Div. 10 Subtotal:				\$731,250

Division 11 - Equipment

Dry Weather Pumps - 1800 gpm	3	EA	\$37,233	\$111,699	Vendor quote; includes pump, motor, VFD, and drive shaft
Wet Weather Pumps - 19,800 gpm	3	EA	\$720,000	\$2,160,000	Vendor quote; includes pump, motor, VFD, and drive shaft
Bar Screens	3	EA	\$130,500	\$391,500	Vendor quote
Screening Compactors	2	EA	\$50,000	\$100,000	Vendor email
Odor Control System	2	EA	\$256,000	\$512,000	Vendor quote; includes Biower/Fans/Carbon
Emergency Generator	1	EA	\$500,000	\$500,000	Engineer's judgment

Equipment Installation	1	PERCENT	30%	\$1,132,560
------------------------	---	---------	-----	-------------

Div. 11 Subtotal:				\$4,907,759
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Division 12 - Furnishings

Not used

Div. 12 Subtotal:				\$0
-------------------	--	--	--	-----

Division 13 - Special Construction

Included in percentages below

Div. 13 Subtotal:				\$0
-------------------	--	--	--	-----

Division 14 - Conveying Systems

Included in Division 11

Div. 14 Subtotal:				\$0
-------------------	--	--	--	-----

Division 15 - Mechanical

Included in percentages below

Div. 15 Subtotal:				\$0
-------------------	--	--	--	-----

Division 16 - Electrical

Included in percentages below

Div. 16 Subtotal:				\$0
-------------------	--	--	--	-----

Subtotal Division 1 - 11 (62%)

\$10,622,731

Percentage of Costs

Metals	3%	\$17,133,437	\$514,003	Based on historical data
Finishes	0%	\$17,133,437	\$0	Incl in Div 10 costs
Process Mechanical Piping	15%	\$17,133,437	\$2,570,016	Based on historical data
I&C	6%	\$17,133,437	\$1,028,006	Based on historical data
Electrical	12%	\$17,133,437	\$2,056,012	Based on historical data

Facility Subtotal:				\$16,790,768
General Requirements	5%		\$839,538	
Overhead	8%		\$1,410,425	
Profit	5%		\$881,515	
Mobilization/Demolization	1.5%		\$264,455	
Bond/Insurance	2%		\$326,161	
	Subtotal:			\$20,512,862
Contingency	20%		\$4,102,572	\$4,102,572
Total Facility Cost:				\$24,615,434

0

ATTACHMENT 3



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER MANAGEMENT BUREAU



BY-PASS REPORT FORM

City or Town: New Haven

Type of By-pass

☐ Raw Sewage
☐ Disinfected Raw Sewage
☐ Partially Treated Sewage
☐ Disinfected Partially Treated Raw Sewage
☐ Sludge Spill
☒ Other: Combined Sewage

Location of Bypass

☐ Treatment Plant
☐ Pump Station
☒ Manhole ☐ Lateral ☐ Basement
☐ Main ☐ Private

Cause of By-Pass

☒ Weather Conditions Rain
☐ Mechanical Equipment Failure
☐ Electric Utility Failure
☐ Electrical Equipment Failure
☐ Approved Shutdown
☐ Limited Capacity: ☐ dry weather ☐ wet weather

Blockage of sewer line due to:

☐ Grease ☐ Roots ☐ Other:
Heavy Rainfall

Exact Location of By-Pass: Intersection of Union Ave and Meadow St

Date and Time By-Pass was Discovered: 10/1/2010 10:45 AM

Date and Time By-Pass was Stopped: 10/1/2010 11:30 AM

By-Pass was Discovered: Motorist called in

Quantity/Volume of By-Pass: Less than 1500 gallons

How Quantity/Volume was Determined: Visual estimate by crew

If Equipment Failure, date of last inspection, maintenance or repairs NA

Receiving Waters (If Applicable) NA

Steps taken to minimize volume and duration of By-Pass: wait for rain to subside to help draining

Action taken to eliminate By-Pass: wait for rain to subside to help draining

Steps taken to prevent recurrence of By-Pass: Continue long term separation project

Was area of By-Pass cleaned of debris? ☒ Yes ☐ No

Method Used: Area on road rinsed down

Date of Last Blockage UNKNOWN Back up Surcharge at this location

Search

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PROGRAMS

[\(/programs.html\)](/programs.html) Serving the Nation

EDUCATION

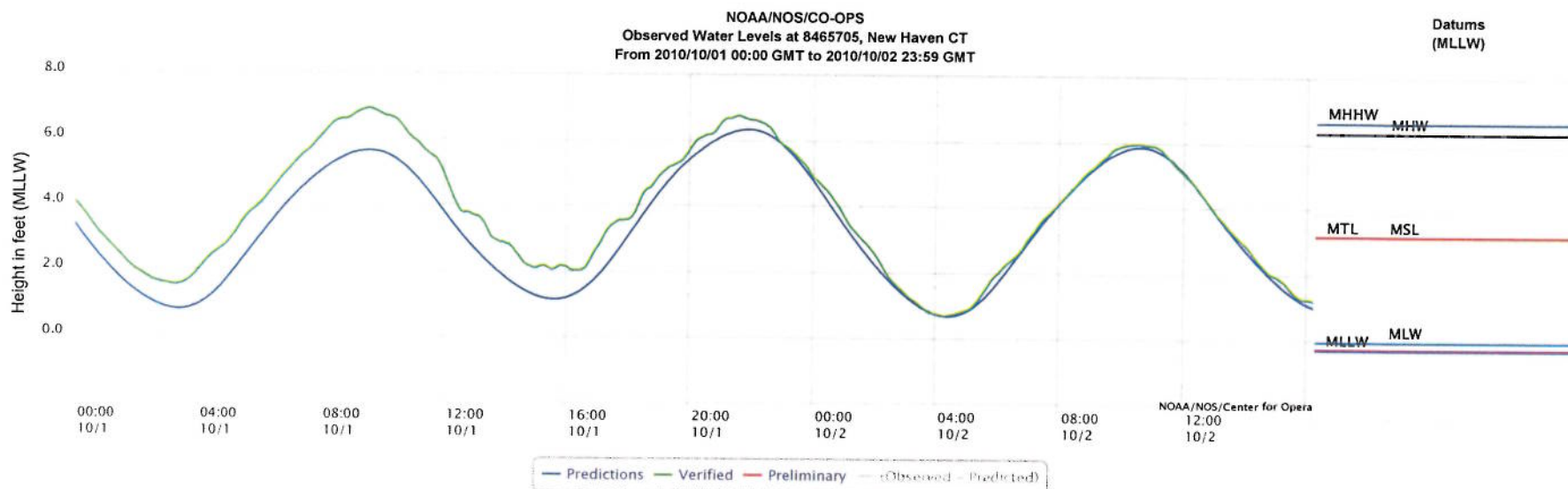
[\(/education.html\)](/education.html) Tides, Currents, and Predictions

HELP & ABOUT

[\(/about.html\)](/about.html) Info and how to reach us[Home \(/\)](#) / [Products \(products.html\)](/products.html) / [Water Levels \(stations.html?type=Water+Levels\)](/stations.html?type=Water+Levels) / [8465705 New Haven, CT](#)

Station Info

Tides/Water Levels

Meteorological Obs. [\(/met.html?id=8465705\)](/met.html?id=8465705)Phys. Oceanography [\(/physocean.html?id=8465705\)](/physocean.html?id=8465705)PORTS® [\(/ports/ports.html?id=8465705\)](/ports/ports.html?id=8465705)

Options for

8465705 New Haven, CT

From:

Oct 1 2010

To:

Oct 2 2010

Units

Feet

Timezone

GMT

Datum

(datum_options.html)

MLLW

Shift dates

Back 1 Day

Forward 1 Day

Interval

6 min

1 hr

H/L

Day

Month

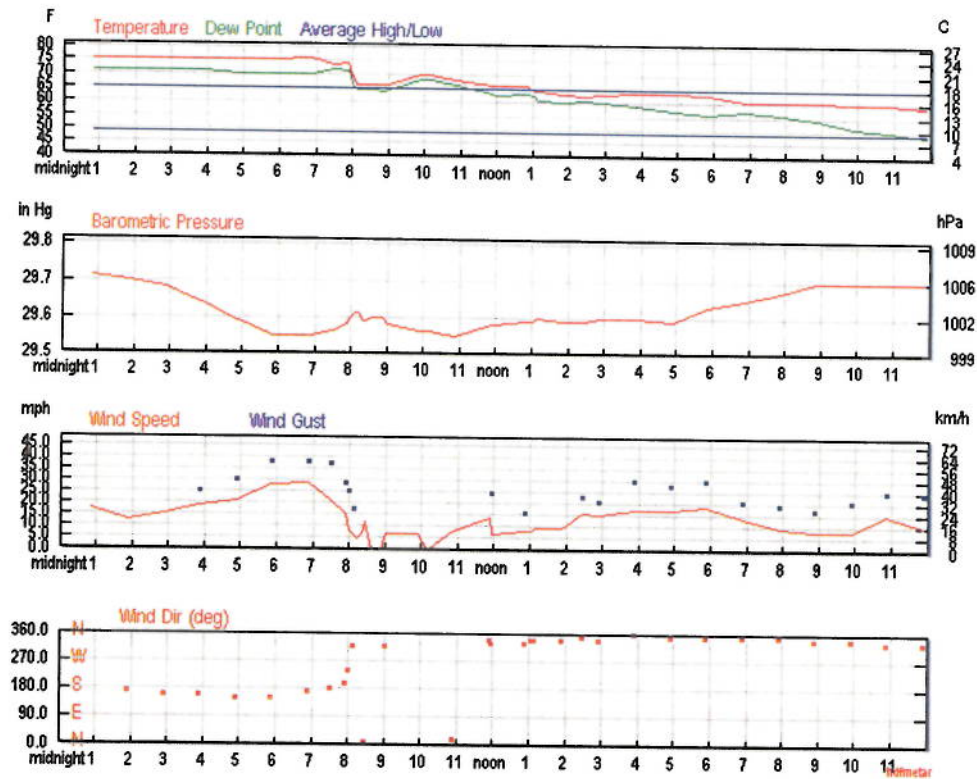
Update

Plot

Data Only

[Hide Data Listing](#)

Date Time	Water Level	NGVD29
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10/1/2010 9:06	6.78	4.25
10/1/2010 9:12	6.83	4.30
10/1/2010 9:18	6.88	4.35
10/1/2010 9:24	6.91	4.38
10/1/2010 9:30	6.95	4.42
10/1/2010 9:36	6.93	4.40
10/1/2010 9:42	6.88	4.35
10/1/2010 9:48	6.85	4.32
10/1/2010 9:54	6.80	4.27
10/1/2010 10:00	6.74	4.21
10/1/2010 10:06	6.72	4.19
10/1/2010 10:12	6.71	4.18
10/1/2010 10:18	6.67	4.14
10/1/2010 10:24	6.62	4.09
10/1/2010 10:30	6.53	4.00
10/1/2010 10:36	6.40	3.87
10/1/2010 10:42	6.28	3.75
10/1/2010 10:48	6.15	3.62
10/1/2010 10:54	6.06	3.53
10/1/2010 11:00	5.98	3.45
10/1/2010 11:06	5.91	3.38
10/1/2010 11:12	5.82	3.29
10/1/2010 11:18	5.72	3.19
10/1/2010 11:24	5.63	3.10
10/1/2010 11:30	5.54	3.01
10/1/2010 11:36	5.49	2.96
10/1/2010 11:42	5.43	2.90
10/1/2010 11:48	5.30	2.77
10/1/2010 11:54	5.11	2.58
10/1/2010 12:00	4.90	2.37



Certify This Report

Hourly Weather History & Observations

Time (EDT)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
12:53 AM	75.0 °F	71.1 °F	87%	29.71 in	8.0 mi	South	17.3 mph	-	N/A		Overcast
1:53 AM	75.0 °F	71.1 °F	87%	29.70 in	7.0 mi	South	12.7 mph	-	N/A		Overcast
2:53 AM	75.0 °F	71.1 °F	87%	29.68 in	8.0 mi	SSE	15.0 mph	23.0 mph	N/A		Overcast
3:53 AM	75.0 °F	71.1 °F	87%	29.64 in	8.0 mi	SSE	18.4 mph	25.3 mph	N/A		Overcast
4:53 AM	75.0 °F	70.0 °F	84%	29.59 in	8.0 mi	SSE	20.7 mph	29.9 mph	N/A		Overcast
5:53 AM	75.0 °F	70.0 °F	84%	29.55 in	9.0 mi	SSE	27.6 mph	38.0 mph	N/A		Overcast
6:53 AM	75.9 °F	70.0 °F	82%	29.55 in	7.0 mi	South	28.8 mph	38.0 mph	N/A		Overcast
7:30 AM	73.4 °F	71.6 °F	94%	29.56 in	2.0 mi	South	20.7 mph	36.8 mph	0.01 in	Rain	Heavy Rain
7:53 AM	73.9 °F	71.1 °F	91%	29.58 in	2.0 mi	SSW	15.0 mph	28.8 mph	0.09 in	Rain	Heavy Rain
8:00 AM	69.8 °F	66.2 °F	88%	29.60 in	2.0 mi	WSW	8.1 mph	25.3 mph	0.02 in	Rain	Rain
8:07 AM	66.2 °F	64.4 °F	94%	29.61 in	1.2 mi	NW	5.8 mph	17.3 mph	0.07 in	Rain	Heavy Rain
8:13 AM	66.2 °F	64.4 °F	94%	29.61 in	2.0 mi	Variable	4.6 mph	-	0.08 in	Rain	Light Rain

Show full METARS | METAR FAQ | Comma Delimited File

Try Our Beta

Time (EDT)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
8:22 AM	66.2 °F	64.4 °F	94%	29.59 in	8.0 mi	Variable	6.9 mph	-	0.09 in	Rain	Light Rain
8:26 AM	66.2 °F	64.4 °F	94%	29.59 in	1.8 mi	North	11.5 mph	17.3 mph	0.17 in	Rain	Heavy Rain
8:36 AM	66.2 °F	64.4 °F	94%	29.60 in	0.8 mi	Calm	Calm	-	0.35 in	Rain	Heavy Rain
8:53 AM	66.0 °F	64.0 °F	93%	29.60 in	1.5 mi	Calm	Calm	-	0.50 in	Rain	Light Rain
9:02 AM	66.2 °F	64.4 °F	94%	29.58 in	10.0 mi	NW	6.9 mph	-	0.03 in	Rain	Light Rain
9:53 AM	70.0 °F	68.0 °F	93%	29.56 in	1.5 mi	Variable	6.9 mph	-	0.21 in	Rain	Light Rain
10:10 AM	69.8 °F	68.0 °F	94%	29.56 in	3.0 mi	Calm	Calm	-	0.06 in	Rain	Light Rain
10:53 AM	68.0 °F	66.0 °F	93%	29.55 in	5.0 mi	NNE	8.1 mph	-	0.10 in	Rain	Light Rain
11:53 AM	66.0 °F	63.0 °F	90%	29.58 in	9.0 mi	NNW	13.8 mph	24.2 mph	0.06 in	Rain	Light Rain
11:55 AM	66.2 °F	62.6 °F	88%	29.58 in	9.0 mi	NNW	6.9 mph	24.2 mph	0.01 in	Rain	Light Rain
12:53 PM	66.0 °F	63.0 °F	90%	29.59 in	9.0 mi	NNW	8.1 mph	16.1 mph	0.01 in	Rain	Light Rain
1:03 PM	64.4 °F	62.6 °F	94%	29.59 in	10.0 mi	NNW	8.1 mph	-	0.00 in	Rain	Light Rain
1:07 PM	64.4 °F	60.8 °F	88%	29.60 in	10.0 mi	NNW	9.2 mph	-	0.00 in	Rain	Light Rain
1:53 PM	63.0 °F	60.1 °F	90%	29.59 in	3.0 mi	NNW	9.2 mph	19.6 mph	0.01 in	Rain	Light Rain
2:28 PM	62.6 °F	60.8 °F	94%	29.59 in	10.0 mi	North	16.1 mph	23.0 mph	0.00 in	Rain	Light Rain
2:53 PM	63.0 °F	60.1 °F	90%	29.60 in	10.0 mi	NNW	15.0 mph	20.7 mph	0.00 in	Rain	Light Rain
3:53 PM	64.0 °F	59.0 °F	84%	29.60 in	10.0 mi	North	17.3 mph	29.9 mph	0.00 in	Rain	Light Rain
4:53 PM	64.0 °F	57.0 °F	78%	29.59 in	10.0 mi	North	17.3 mph	27.6 mph	0.00 in	Rain	Light Rain
5:53 PM	63.0 °F	55.9 °F	78%	29.63 in	10.0 mi	North	18.4 mph	29.9 mph	0.00 in	Rain	Light Rain
6:53 PM	61.0 °F	57.0 °F	87%	29.65 in	8.0 mi	North	13.8 mph	20.7 mph	0.06 in	Rain	Light Rain
7:53 PM	61.0 °F	55.9 °F	83%	29.67 in	10.0 mi	North	9.2 mph	19.6 mph	0.00 in	Rain	Light Rain
8:53 PM	61.0 °F	54.0 °F	78%	29.70 in	10.0 mi	NNW	8.1 mph	17.3 mph	0.00 in	Rain	Light Rain
9:53 PM	60.1 °F	51.1 °F	72%	29.70 in	10.0 mi	NNW	8.1 mph	20.7 mph	0.00 in	Rain	Light Rain
10:53 PM	60.1 °F	50.0 °F	69%	29.70 in	10.0 mi	NNW	15.0 mph	25.3 mph	0.00 in	Rain	Light Rain
11:53 PM	59.0 °F	48.0 °F	67%	29.70 in	10.0 mi	NNW	10.4 mph	24.2 mph	0.00 in	Rain	Light Rain

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER MANAGEMENT BUREAU



BY-PASS REPORT FORM

City or Town:

New Haven

Type of By-pass

- ☒ Raw Sewage/Rain
☐ Disinfected Raw Sewage
☐ Partially Treated Sewage
☐ Disinfected Partially Treated Raw Sewage
☐ Sludge Spill
☐ Other: _____

Location of Bypass

- ☐ Treatment Plant
☐ Pump Station
☒ Manhole _____ Lateral _____ Basement _____
☐ Main _____ Private _____

Cause of By-Pass

- ☒ Weather Conditions Heavy Rain
☐ Mechanical Equipment Failure
☐ Electric Utility Failure
☐ Electrical Equipment Failure
☐ Approved Shutdown
☐ Limited Capacity: _____ dry weather
_____ wet weather

Blockage of sewer line due to:

☐ Grease ☐ Roots ☐ Other: _____

Exact Location of By-Pass:

1 Union Ave, New Haven

Date and Time By-Pass was Discovered:

6/23/11

2:45 pm

Date and Time By-Pass was Stopped

6/23/11

3:02 pm

By-Pass was Discovered:

Resident called in - manholes
overflowing.

Quantity/Volume of By-Pass:

30,000 gal - combined w/ Rain water

How Quantity/Volume was Determined:

Field estimate by crew - over 2"
of rain in 1HR. Bypass mostly Rain water

If Equipment Failure, date of last inspection, maintenance or repairs

N/A

Receiving Waters (If Applicable)

Long Island Sound

Steps taken to minimize volume and duration of By-Pass:

wait for rain + flows
to subside

Action taken to eliminate By-Pass:

wait for rain to subside

Steps taken to prevent recurrence of By-Pass:

continue PM setting program

Was area of By-Pass cleaned of debris?

☒ Yes

☐ No

Method Used:

Rinse and VAC road area

Date of Last Blockage _____ Back up _____ Surcharge ☒ at this location _____

10/1/2010

PRODUCTS

[\(/products.html\)](/products.html) Data, Analyses, and Publications

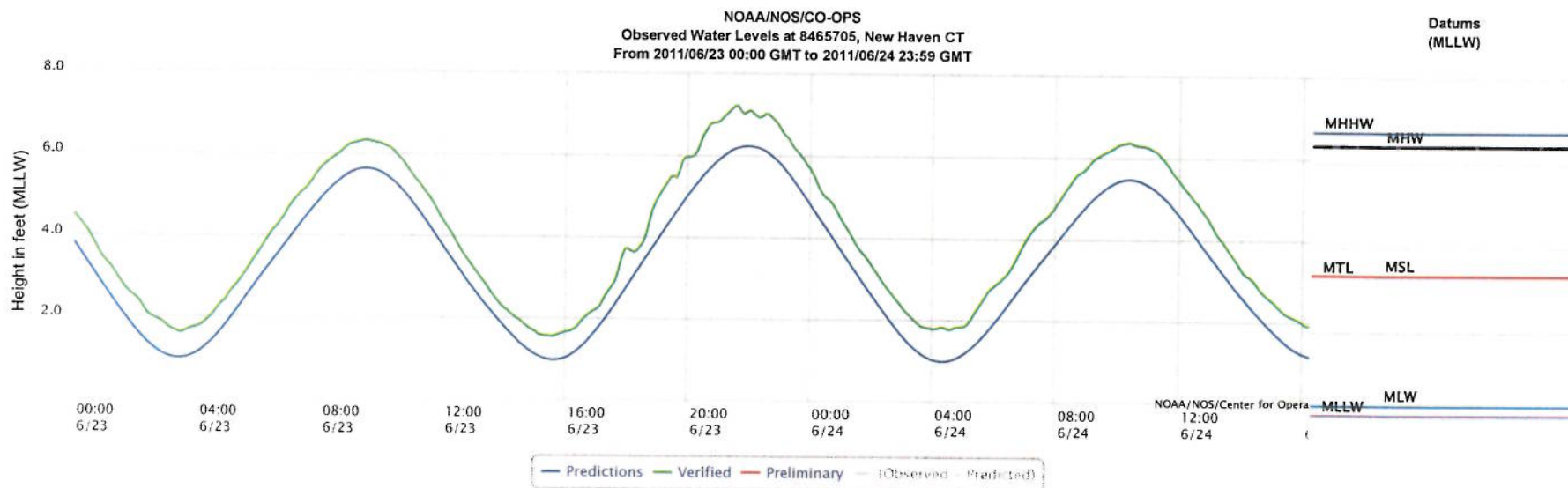
PROGRAMS

[\(/programs.html\)](/programs.html) Serving the Nation

EDUCATION

[\(/education.html\)](/education.html) Tides, Currents, and Predictions

HELP & ABOUT

[\(/about.html\)](/about.html) Info and how to reach us[Home \(/\)](#) / [Products \(products.html\)](#) / [Water Levels \(stations.html?type=Water+Levels\)](#) / [8465705 New Haven, CT](#)[Station Info](#)[Tides/Water Levels](#)[Meteorological Obs. \(/met.html?id=8465705\)](/met.html?id=8465705)[Phys. Oceanography \(/physocean.html?id=8465705\)](/physocean.html?id=8465705)[PORTS* \(/ports/ports.html?id=8465705\)](/ports/ports.html?id=8465705)

Options for

8465705 New Haven, CT

From:

Jun 23 2011

To:

Jun 24 2011

Units

Feet

Timezone

GMT

Datum

(datum_options.html)

MLLW

Shift dates

Back 1 Day

Forward 1 Day

Interval

6 min

1 hr

H/L

Day

Month

Update

Plot

Data Only

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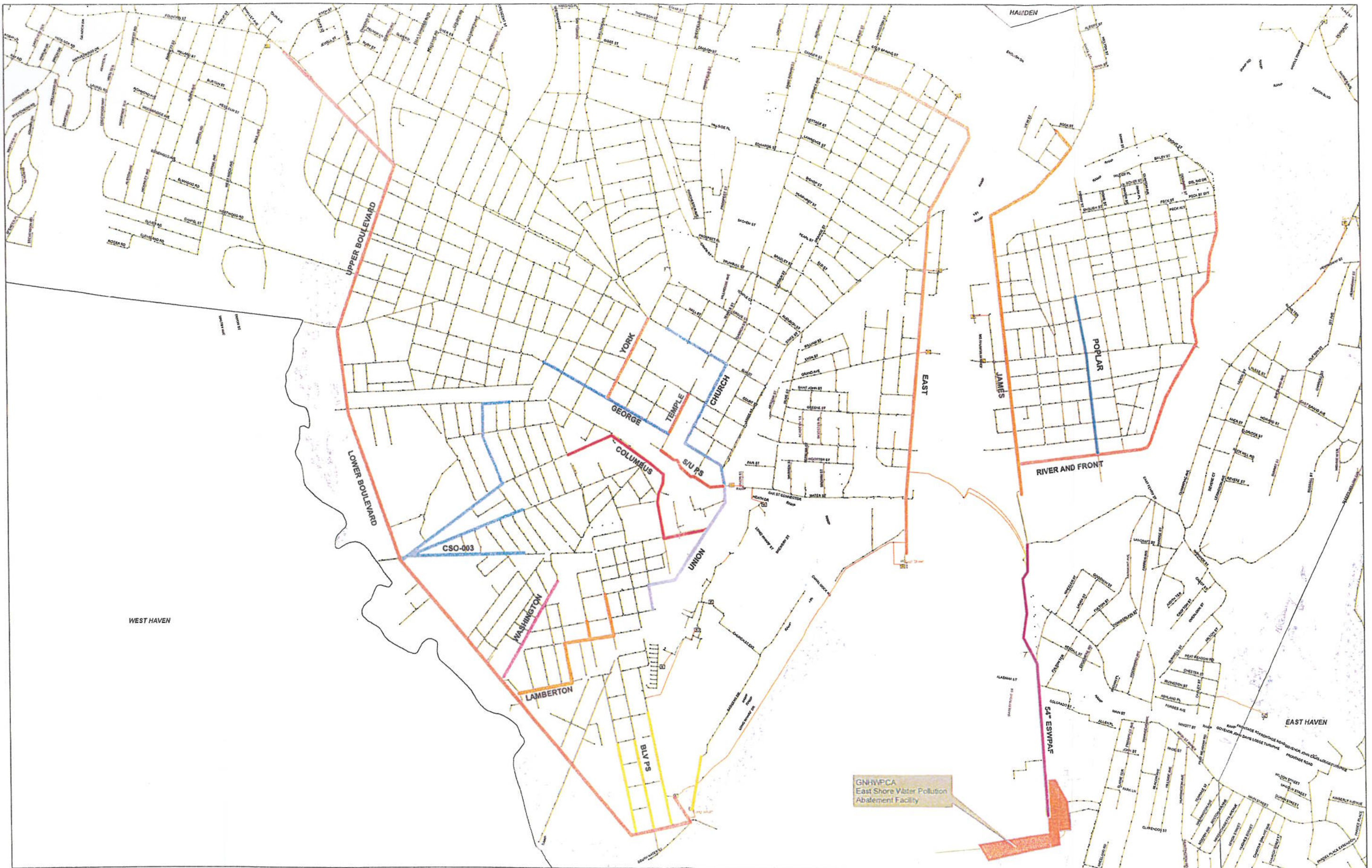
Date Time	Water Level	NGVD29
6/23/2011 13:00	3.22	0.69
6/23/2011 13:06	3.11	0.58
6/23/2011 13:12	3.02	0.49
6/23/2011 13:18	2.92	0.39
6/23/2011 13:24	2.82	0.29
6/23/2011 13:30	2.70	0.17
6/23/2011 13:36	2.58	0.05
6/23/2011 13:42	2.48	-0.05
6/23/2011 13:48	2.39	-0.14
6/23/2011 13:54	2.30	-0.23
6/23/2011 14:00	2.23	-0.30
6/23/2011 14:06	2.17	-0.36
6/23/2011 14:12	2.10	-0.43
6/23/2011 14:18	2.03	-0.50
6/23/2011 14:24	1.99	-0.54
6/23/2011 14:30	1.94	-0.59
6/23/2011 14:36	1.87	-0.66
6/23/2011 14:42	1.80	-0.73
6/23/2011 14:48	1.75	-0.79
6/23/2011 14:54	1.70	-0.83
6/23/2011 15:00	1.66	-0.87
6/23/2011 15:06	1.60	-0.93
6/23/2011 15:12	1.57	-0.96
6/23/2011 15:18	1.55	-0.98
6/23/2011 15:24	1.55	-0.98
6/23/2011 15:30	1.54	-0.99
6/23/2011 15:36	1.54	-0.99
6/23/2011 15:42	1.57	-0.96
6/23/2011 15:48	1.60	-0.93
6/23/2011 15:54	1.63	-0.90
6/23/2011 16:00	1.66	-0.87

Time (EDT)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
6:53 AM	69.1 °F	66.0 °F	90%	29.81 in	3.0 mi	North	6.9 mph	-	N/A		Overcast
7:53 AM	69.1 °F	66.0 °F	90%	29.82 in	7.0 mi	NE	8.1 mph	-	N/A		Overcast
8:18 AM	69.8 °F	66.2 °F	88%	29.81 in	8.0 mi	NNE	10.4 mph	-	N/A		Overcast
8:53 AM	70.0 °F	66.0 °F	87%	29.81 in	10.0 mi	NE	6.9 mph	-	N/A		Overcast
9:53 AM	71.1 °F	66.9 °F	87%	29.80 in	10.0 mi	NE	5.8 mph	-	N/A		Overcast
10:53 AM	73.9 °F	66.9 °F	79%	29.79 in	10.0 mi	NNE	8.1 mph	-	N/A		Overcast
11:00 AM	75.2 °F	66.2 °F	73%	29.79 in	10.0 mi	NNE	5.8 mph	-	N/A		Overcast
11:53 AM	71.1 °F	66.9 °F	87%	29.80 in	10.0 mi	ESE	6.9 mph	-	N/A		Overcast
12:53 PM	69.1 °F	64.9 °F	87%	29.77 in	10.0 mi	ENE	6.9 mph	-	0.00 in	Rain	Light Rain
1:38 PM	69.8 °F	64.4 °F	83%	29.76 in	5.0 mi	West	8.1 mph	-	0.07 in	Rain	Rain
1:45 PM	69.8 °F	66.2 °F	88%	29.78 in	1.8 mi	West	9.2 mph	18.4 mph	0.12 in	Rain	Heavy Rain
1:47 PM	69.8 °F	66.2 °F	88%	29.78 in	0.8 mi	Variable	4.6 mph	18.4 mph	0.14 in	Rain	Heavy Rain
1:53 PM	68.0 °F	64.9 °F	90%	29.77 in	0.2 mi	Variable	5.8 mph	-	0.21 in	Fog , Rain	Heavy Rain
1:58 PM	68.0 °F	64.4 °F	88%	29.78 in	0.5 mi	South	8.1 mph	-	0.05 in	Fog , Rain	Heavy Rain
2:19 PM	68.0 °F	64.4 °F	88%	29.78 in	1.5 mi	NNW	6.9 mph	-	0.23 in	Rain	Heavy Rain
2:24 PM	68.0 °F	64.4 °F	88%	29.79 in	3.0 mi	NNE	4.6 mph	-	0.27 in	Rain	Rain
2:38 PM	68.0 °F	64.4 °F	88%	29.79 in	2.0 mi	East	4.6 mph	-	0.36 in	Rain	Heavy Rain
2:53 PM	68.0 °F	66.2 °F	94%	29.78 in	2.0 mi	NNE	3.5 mph	-	N/A	Rain	Heavy Rain
3:00 PM	68.0 °F	66.2 °F	94%	29.77 in	4.0 mi	North	5.8 mph	-	0.04 in	Rain	Light Rain
3:13 PM	68.0 °F	64.4 °F	88%	29.77 in	10.0 mi	ENE	5.8 mph	-	0.11 in		Overcast
3:53 PM	68.0 °F	64.9 °F	90%	29.77 in	10.0 mi	East	6.9 mph	-	0.30 in	Rain	Light Rain
3:57 PM	68.0 °F	64.4 °F	88%	29.77 in	7.0 mi	ENE	4.6 mph	-	0.02 in	Rain	Rain
4:12 PM	68.0 °F	64.4 °F	88%	29.77 in	2.5 mi	NE	5.8 mph	-	0.08 in	Rain	Heavy Rain
4:16 PM	68.0 °F	64.4 °F	88%	29.77 in	3.0 mi	NE	3.5 mph	-	0.10 in	Rain	Rain
4:26 PM	68.0 °F	66.2 °F	94%	29.77 in	7.0 mi	East	3.5 mph	-	0.14 in	Rain	Light Rain
4:53 PM	69.1 °F	64.9 °F	87%	29.76 in	10.0 mi	ENE	9.2 mph	-	0.24 in		Overcast
5:53 PM	68.0 °F	64.0 °F	87%	29.77 in	10.0 mi	NE	6.9 mph	-	0.15 in		Mostly Cloudy
6:00 PM	68.0 °F	64.4 °F	88%	29.77 in	10.0 mi	NNE	5.8 mph	-	N/A		Overcast
6:53 PM	66.2 °F	62.6 °F	88%	29.75 in	10.0 mi	NE	9.2 mph	-	N/A		Overcast
7:53 PM	66.0 °F	62.1 °F	87%	29.77 in	10.0 mi	NE	3.5 mph	-	N/A		Overcast
8:53 PM	66.0 °F	62.1 °F	87%	29.78 in	10.0 mi	ENE	4.6 mph	-	N/A		Overcast
9:53 PM	64.9 °F	62.1 °F	90%	29.77 in	10.0 mi	NE	3.5 mph	-	N/A		Overcast
10:40 PM	64.4 °F	62.6 °F	94%	29.76 in	10.0 mi	ENE	4.6 mph	-	N/A		Overcast
10:53 PM	64.9 °F	62.1 °F	90%	29.76 in	10.0 mi	NE	5.8 mph	-	N/A		Overcast
11:53 PM	64.9 °F	62.1 °F	90%	29.77 in	10.0 mi	Calm	Calm	-	N/A		Overcast

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ATTACHMENT 4



GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY
LARGE DIAMETER SEWERS
STATE/UNION PS TO REG 034
TABLE 4-1

<u>PIPE ID</u>	<u>STREET</u>	<u>PIPE AGE</u>	<u>PIPE MATERIAL</u>	<u>PIPE WIDTH (in)</u>	<u>PIPE HEIGHT (in)</u>	<u>PIPE NOMINAL DIAMETER (in)</u>	<u>PIPE LENGTH (ft)</u>	<u>PIPE UPSTREAM INVERT (NGVD29)</u>	<u>PIPE DOWNSTREAM INVERT (NGVD29)</u>	<u>PIPE SLOPE (ft/ft)</u>	<u>PIPE UPSTREAM MH RIM (NGVD29)</u>	<u>PIPE UPSTREAM DEPTH (ft)</u>	<u>PIPE DOWNSTREAM MH RIM (NGVD29)</u>	<u>PIPE DOWNSTREAM DEPTH (ft)</u>
NUN03P0074	North Frontage Road	1961	RCP			42	118	-5.02	-5.75	0.00619	18.00	23.02	18.00	23.75
NUN04P0059	North Frontage Road	1961	RCP			30	312	3.00	2.80	0.00064	17.50	14.50	18.00	15.20
NUN04P0058	North Frontage Road	1961	RCP			30	134	3.45	3.00	0.00336	17.00	13.55	17.50	14.50
NUN04P0057	North Frontage Road	1961	RCP			30	262	3.48	3.45	0.00011	17.40	13.92	17.00	13.55
NUN04P0750	North Frontage Road	1961	RCP			30	11	3.51	3.48	0.00273	17.40	13.89	17.40	13.92
NUN04P0094	North Frontage Road	1961	RCP			30	71	3.73	3.51	0.00310	18.00	14.27	17.40	13.89
NUN04P0206	North Frontage Road	1961	RCP			30	271	3.75	3.73	0.00007	24.50	20.75	18.00	14.27
NUN04P0205	North Frontage Road	1961	RCP			30	158	3.77	3.75	0.00013	27.00	23.23	24.50	20.75
NUN04P0204	North Frontage Road	1961	RCP			30	67	3.78	3.77	0.00015	27.00	23.22	27.00	23.23
NUN04P0468	North Frontage Road	1961	RCP			30	299	3.80	3.78	0.00007	15.90	12.10	27.00	23.22
NUN04P0467	North Frontage Road	1961	RCP			30	38	4.09	3.80	0.00763	15.50	11.41	15.90	12.10
NUN04P0466	Temple Street	1961	RCP			30	77	4.38	4.09	0.00377	14.50	10.12	15.50	11.41

GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY
LARGE DIAMETER SEWERS
GEORGE STREET SEWER
TABLE 4-2

<u>PIPE ID</u>	<u>STREET</u>	<u>PIPE AGE</u>	<u>PIPE MATERIAL</u>	<u>PIPE WIDTH (in)</u>	<u>PIPE HEIGHT (in)</u>	<u>PIPE NOMINAL DIAMETER (in)</u>	<u>PIPE LENGTH (ft)</u>	<u>PIPE UPSTREAM INVERT (NGVD29)</u>	<u>PIPE DOWNSTREAM INVERT (NGVD29)</u>	<u>PIPE SLOPE (ft/ft)</u>	<u>PIPE UPSTREAM MH RIM (NGVD29)</u>	<u>PIPE UPSTREAM DEPTH (ft)</u>	<u>PIPE DOWNSTREAM MH RIM (NGVD29)</u>	<u>PIPE DOWNSTREAM DEPTH (ft)</u>
NUN04P0096	George Street	1861	Brick	36	48	48	20	12.94	12.60	0.01700	21.50	8.56	21.50	8.90
NUN04P0095	George Street	1861	Brick	36	48	48	271	14.72	12.94	0.00657	23.20	8.48	21.50	8.56
NUN04P0773	George Street	1861	Brick	36	48	48	247	16.15	14.72	0.00579	25.90	9.75	23.20	8.48
NUN04P0793	George Street	1861	Brick	36	48	48	240	17.95	16.15	0.00750	30.90	12.95	25.90	9.75
NUN04P0510	George Street	1861	Brick	36	48	48	251	19.19	17.95	0.00494	35.70	16.51	30.90	12.95
NUN03P0509	George Street	1861	Brick	36	48	48	224	20.18	19.19	0.00442	34.90	14.72	35.70	16.51
NUN03P0508	George Street	1861	Brick	36	48	48	183	21.73	20.18	0.00847	34.80	13.07	34.90	14.72
NUN03P0507	George Street	1861	Brick	36	48	48	23	21.90	21.73	0.00739	34.50	12.60	34.80	13.07
NUN03P0213	George Street	1861	Brick	36	48	48	238	23.64	21.90	0.00731	32.10	8.46	34.50	12.60
NUN03P0212	George Street	1861	Brick	36	48	48	256	25.17	23.64	0.00598	33.90	8.73	32.10	8.46
NUN03P0154	George Street	1872	Brick	30	45	38	21	25.25	25.17	0.00381	34.00	8.75	33.90	8.73
NUN03P0153	George Street	1872	Brick	30	45	38	250	25.91	25.25	0.00264	39.80	13.89	34.00	8.75
NUN03P0152	George Street	1872	Brick	30	45	38	273	26.44	25.91	0.00194	42.50	16.06	39.80	13.89

GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY
LARGE DIAMETER SEWERS
TEMPLE STREET SEWER
TABLE 4-3

<u>PIPE ID</u>	<u>STREET</u>	<u>PIPE AGE</u>	<u>PIPE MATERIAL</u>	<u>PIPE WIDTH (in)</u>	<u>PIPE HEIGHT (in)</u>	<u>PIPE NOMINAL DIAMETER (in)</u>	<u>PIPE LENGTH (ft)</u>	<u>PIPE UPSTREAM INVERT (NGVD29)</u>	<u>PIPE DOWNSTREAM INVERT (NGVD29)</u>	<u>PIPE SLOPE (ft/ft)</u>	<u>PIPE UPSTREAM MH RIM (NGVD29)</u>	<u>PIPE UPSTREAM DEPTH (ft)</u>	<u>PIPE DOWNSTREAM MH RIM (NGVD29)</u>	<u>PIPE DOWNSTREAM DEPTH (ft)</u>
NUN04P0229	Temple Street	1945	Brick	20	30	25	33	13.57	12.60	0.02939	22.00	8.43	21.50	8.90
NUN04P0772	Temple Street	1945	Brick	20	30	25	173	14.15	13.57	0.00335	25.60	11.45	22.00	8.43
NUN04P0791	Temple Street	1877	Brick	25	37	31	173	14.73	14.15	0.00335	28.50	13.77	25.60	11.45
NUN04P0739	Temple Street	1877	Brick	25	37	31	172	15.16	14.73	0.00250	27.20	12.04	28.50	13.77
NUN04P0738	Temple Street	1877	Brick	25	37	31	174	15.59	15.16	0.00247	26.60	11.01	27.20	12.04
NUN04P0737	Temple Street	1877	Brick	25	37	31	166	16.00	15.59	0.00247	25.20	9.20	26.60	11.01

GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY
LARGE DIAMETER SEWERS
CHURCH STREET SEWER
TABLE 4-4

PIPE ID	STREET	PIPE AGE	PIPE MATERIAL	PIPE WIDTH (in)	PIPE HEIGHT (in)	PIPE NOMINAL DIAMETER (in)	PIPE LENGTH (ft)	PIPE UPSTREAM INVERT (NGVD29)	PIPE DOWNSTREAM INVERT (NGVD29)	PIPE SLOPE (ft/ft)	PIPE UPSTREAM MH RIM (NGVD29)	PIPE UPSTREAM DEPTH (ft)	PIPE DOWNSTREAM MH RIM (NGVD29)	PIPE DOWNSTREAM DEPTH (ft)
NUN04P0969	State Street @ REG 025	1864	Brick	48	60	54	325	4.92	2.80	0.00652	16.40	11.48	18.00	15.20
NUN04P0966	State Street	1864	Brick	48	60	54	133	5.47	4.92	0.00414	15.50	10.03	16.40	11.48
NUN04P0746	George Street	1864	Brick	48	60	54	275	6.70	5.47	0.00447	18.50	11.80	15.50	10.03
NUN04P0813	George Street	1864	Brick	48	60	54	247	7.78	6.70	0.00437	20.10	12.32	18.50	11.80
NUN04P0812	George Street	1864	Brick	48	60	54	244	9.40	7.78	0.00664	20.50	11.10	20.10	12.32
NUN04P0751	Church Street	1865	Brick	30	40	35	353	10.89	9.40	0.00422	24.30	13.41	20.50	11.10
NUN04P0770	Church Street	1865	Brick	30	40	35	248	12.30	10.89	0.00569	22.40	10.10	24.30	13.41
NUN04P0769	Church Street	1865	Brick	30	40	35	291	12.30	12.30	0.00000	22.40	10.10	22.40	10.10
NUN04P0767	Church Street	1865	Brick	30	40	35	67	12.45	12.30	0.00224	21.50	9.05	22.40	10.10
NUN04P0766	Church Street	1865	Brick	30	40	35	202	12.79	12.45	0.00168	22.80	10.01	21.50	9.05
NUN04P0765	Church Street	1865	Brick	30	40	35	154	13.02	12.79	0.00149	23.90	10.88	22.80	10.01
NUN04P0764	Church Street	1865	Brick	30	40	35	435	14.25	13.02	0.00283	25.30	11.05	23.90	10.88
NUN02P0887	Church Street	1865	Brick	30	40	35	237	15.26	14.25	0.00426	25.50	10.24	25.30	11.05
NUN02P0886	Church Street	1865	Brick	30	40	35	102	15.57	15.26	0.00304	26.60	11.03	25.50	10.24
NUN02P0885	Church Street	1865	Brick	30	40	35	101	15.79	15.57	0.00218	27.00	11.21	26.60	11.03
NUN02P0884	Church Street	1865	Brick	30	40	35	101	16.00	15.79	0.00208	27.00	11.00	27.00	11.21
NUN02P0928	Church Street	1865	Brick	30	40	35	100	16.28	16.00	0.00280	27.28	11.00	27.00	11.00
NUN02P0926	Church Street	1865	Brick	30	40	35	101	16.47	16.28	0.00188	25.10	8.63	27.28	11.00
NUN02P0925	Church Street	1865	Brick	30	40	35	100	16.82	16.47	0.00350	24.80	7.98	25.10	8.63
NUN02P0921	Church Street	1865	Brick	30	40	35	100	16.86	16.82	0.00040	24.00	7.14	24.80	7.98
NUN02P0981	Grove Street	1875	Brick	20	30	25	67	17.09	16.86	0.00343	25.10	8.01	24.00	7.14
NUN02P0918	Grove Street	1875	Brick	20	30	25	171	17.52	17.09	0.00251	25.50	7.98	25.10	8.01
NUN02P0917	Grove Street	1875	Brick	20	30	25	169	17.93	17.52	0.00243	27.60	9.67	25.50	7.98
NUN02P0914	Grove Street	1875	Brick	20	30	25	137	18.51	17.93	0.00423	28.40	9.89	27.60	9.67
NUN02P0913	Grove Street	1875	Brick	20	30	25	137	18.85	18.51	0.00248	28.80	9.95	28.40	9.89

GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY
LARGE DIAMETER SEWERS
YORK STREET SEWER
TABLE 4-5

<u>PIPE</u> <u>ID</u>	<u>STREET</u>	<u>PIPE</u> <u>AGE</u>	<u>PIPE</u> <u>MATERIAL</u>	<u>PIPE</u> <u>WIDTH (in)</u>	<u>PIPE</u> <u>HEIGHT (in)</u>	<u>PIPE NOMINAL</u> <u>DIAMETER (in)</u>	<u>PIPE</u> <u>LENGTH (ft)</u>	<u>PIPE UPSTREAM</u> <u>INVERT (NGVD29)</u>	<u>PIPE DOWNSTREAM</u> <u>INVERT (NGVD29)</u>	<u>PIPE</u> <u>SLOPE (ft/ft)</u>	<u>PIPE UPSTREAM</u> <u>MH RIM (NGVD29)</u>	<u>PIPE UPSTREAM</u> <u>DEPTH (ft)</u>	<u>PIPE DOWNSTREAM</u> <u>MH RIM (NGVD29)</u>	<u>PIPE DOWNSTREAM</u> <u>DEPTH (ft)</u>
NUN03P0520	York Street	1869	Cement	20	30	25	34	22.84	22.18	0.01941	35.00	12.16	34.80	12.62
NUN03P0519	State Street	1869	Cement	20	30	25	362	24.93	22.84	0.00577	40.50	15.57	35.00	12.16
NUN03P0518	George Street	1869	Cement	20	30	25	200	26.17	24.93	0.00620	42.10	15.93	40.50	15.57
NUN03P0621	George Street	1869	Cement	20	30	25	210	26.75	26.17	0.00276	43.00	16.25	42.10	15.93
NUN03P0620	George Street	1869	Cement	20	30	25	68	27.00	26.75	0.00368	43.50	16.50	43.00	16.25
NUN03P0619	Church Street	1869	Cement	20	30	25	55	27.28	27.00	0.00509	43.90	16.62	43.50	16.50
NUN03P0609	Church Street	1869	Cement	20	30	25	216	27.50	27.28	0.00102	42.89	15.39	43.90	16.62
NUN03P0618	Church Street	1869	Cement	20	30	25	216	27.73	27.50	0.00106	44.40	16.67	42.89	15.39
NUN03P0715	Church Street	1869	Cement	20	30	25	413	29.54	27.73	0.00438	45.60	16.06	44.40	16.67

GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY
LARGE DIAMETER SEWERS
UNION AVENUE SEWER
TABLE 4-6

<u>PIPE ID</u>	<u>STREET</u>	<u>PIPE AGE</u>	<u>PIPE MATERIAL</u>	<u>PIPE WIDTH (in)</u>	<u>PIPE HEIGHT (in)</u>	<u>PIPE NOMINAL DIAMETER (in)</u>	<u>PIPE LENGTH (ft)</u>	<u>PIPE UPSTREAM INVERT (NGVD29)</u>	<u>PIPE DOWNSTREAM INVERT (NGVD29)</u>	<u>PIPE SLOPE (ft/ft)</u>	<u>PIPE UPSTREAM MH RIM (NGVD29)</u>	<u>PIPE UPSTREAM DEPTH (ft)</u>	<u>PIPE DOWNSTREAM MH RIM (NGVD29)</u>	<u>PIPE DOWNSTREAM DEPTH (ft)</u>
NUN04P0842	Union Avenue	1945	RCP			36	69	-4.96	-5.02	0.00087	17.40	22.36	18.00	23.02
NUN04P0841	Union Avenue	1945	RCP			36	140	-4.82	-4.96	0.00100	15.00	19.82	17.40	22.36
NUN04P0840	Union Avenue	1945	RCP			36	57	-4.73	-4.82	0.00158	14.00	18.73	15.00	19.82
NUN04P0839	Union Avenue	1945	RCP			36	44	-4.62	-4.73	0.00250	13.70	18.32	14.00	18.73
NUN04P0838	Union Avenue	1945	RCP			36	45	-4.59	-4.62	0.00067	12.50	17.09	13.70	18.32
NUN05P0003	Union Avenue	1945	RCP			36	317	-4.30	-4.59	0.00091	10.60	14.90	12.50	17.09
NUN05P0361	Union Avenue	1945	RCP			36	263	-4.05	-4.30	0.00095	9.90	13.95	10.60	14.90
NUN05P0360	Union Avenue	1945	Cast Iron			36	23	-3.46	-4.05	0.02565	9.90	13.36	9.90	13.95
NUN05P0359	Union Avenue	1911	Brick			54	190	0.81	-0.30	0.00584	10.80	9.99	9.90	10.20
NUN05P0358	Union Avenue	1911	Brick			54	183	0.86	0.81	0.00027	12.00	11.14	10.80	9.99
NUN05P0168	Union Avenue	1911	Brick	30	45	38	168	1.87	0.86	0.00601	12.50	10.63	12.00	11.14
NUN05P0189	Union Avenue	1911	Brick	30	45	38	37	2.07	1.87	0.00541	12.70	10.63	12.50	10.63
NUN05P0174	Union Avenue	1911	Brick	30	45	38	177	2.99	2.07	0.00520	14.90	11.91	12.70	10.63
NUN05P0173	Union Avenue	1911	Brick	30	45	38	164	4.10	2.99	0.00677	21.90	17.80	14.90	11.91
NUN05P0172	Union Avenue	1911	Brick	30	45	38	245	5.73	4.10	0.00665	31.90	26.17	21.90	17.80
NUN05P0171	Putnam Street	1911	Brick	30	45	38	28	6.23	5.73	0.01786	33.00	26.77	31.90	26.17
NUN05P0170	Putnam Street	1896	Brick	20	30	25	156	6.76	6.23	0.00340	34.50	27.74	33.00	26.77
NUN05P0156	Putnam Street	1896	Brick	20	30	25	168	7.32	6.76	0.00333	32.40	25.08	34.50	27.74
NUN06P0221	Putnam Street	1896	Brick	20	30	25	170	7.87	7.32	0.00324	35.40	27.53	32.40	25.08
NUN06P0048	Liberty Street	1896	Brick	20	30	25	28	8.16	7.87	0.01036	34.50	26.34	35.40	27.53
NUN06P0176	Liberty Street	1896	Brick	20	30	25	157	8.63	8.16	0.00299	32.00	23.37	34.50	26.34
NUN06P0175	Liberty Street	1896	Brick	20	30	25	148	9.00	8.63	0.00250	29.00	20.00	32.00	23.37
NUN06P0412	Liberty Street	1896	Brick	20	30	25	153	9.38	9.00	0.00248	26.50	17.12	29.00	20.00

GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY

LARGE DIAMETER SEWERS
COLUMBUS AVENUE SEWER

TABLE 4-7

<u>PIPE ID</u>	<u>STREET</u>	<u>PIPE AGE</u>	<u>PIPE MATERIAL</u>	<u>PIPE WIDTH (in)</u>	<u>PIPE HEIGHT (in)</u>	<u>PIPE NOMINAL DIAMETER (in)</u>	<u>PIPE LENGTH (ft)</u>	<u>PIPE UPSTREAM INVERT (NGVD29)</u>	<u>PIPE DOWNSTREAM INVERT (NGVD29)</u>	<u>PIPE SLOPE (ft/ft)</u>	<u>PIPE UPSTREAM MH RIM (NGVD29)</u>	<u>PIPE UPSTREAM DEPTH (ft)</u>	<u>PIPE DOWNSTREAM MH RIM (NGVD29)</u>	<u>PIPE DOWNSTREAM DEPTH (ft)</u>
NUN05P0388	Columbus Avenue	1945	RCP			30	319	-1.03	-3.46	0.00762	10.10	11.13	9.90	13.36
NUN05P0387	Columbus Avenue	1945	RCP			30	292	-0.73	-1.03	0.00103	11.00	11.73	10.10	11.13
NUN06P0381	Columbus Avenue	1945	RCP			30	334	0.79	-0.73	0.00455	24.70	23.91	11.00	11.73
NUN05P0378	Columbus Avenue	1945	RCP			30	40	0.84	0.79	0.00125	24.00	23.16	24.70	23.91
NUN05P0377	Church Street South	1945	RCP			30	227	1.13	0.84	0.00128	19.00	17.87	24.00	23.16
NUN05P0376	Church Street South	1945	RCP			30	339	1.44	1.13	0.00091	19.50	18.06	19.00	17.87
NUN05P0375	Church Street South	1961	RCP			30	130	1.93	1.44	0.00377	21.50	19.57	19.50	18.06
NUN05P0374	Church Street South	1961	RCP			30	46	2.09	1.93	0.00348	19.80	17.71	21.50	19.57
NUN05P0373	Church Street South	1961	RCP			30	20	2.57	-0.30	0.14350	21.00	18.43	19.80	20.10
NUN05P0372	Church Street South	1961	RCP			30	116	2.69	2.57	0.00103	23.20	20.51	21.00	18.43
NUN05P0371	Church Street South	1961	RCP			30	42	2.73	2.69	0.00095	23.30	20.57	23.20	20.51
NUN05P0156	Church Street South	1961	RCP			30	184	2.95	2.73	0.00120	24.50	21.55	23.30	20.57
NUN05P0203	Church Street South	1961	RCP			30	184	3.00	2.95	0.00027	24.40	21.40	24.50	21.55
NUN05P0817	South Frontage Road	1961	RCP			30	386	3.34	3.00	0.00088	23.70	20.36	24.40	21.40
NUN05P0816	South Frontage Road	1961	RCP			30	131	3.54	3.34	0.00153	26.00	22.46	23.70	20.36
NUN05P0815	South Frontage Road	1961	RCP			30	185	3.74	3.54	0.00108	31.00	27.26	26.00	22.46
NUN05P0485	South Frontage Road	1961	RCP			30	152	3.97	3.74	0.00151	32.00	28.03	31.00	27.26
NUN05P0011	South Frontage Road	1961	RCP			30	234	4.44	3.97	0.00201	21.00	16.56	32.00	28.03
NUN05P0010	South Frontage Road	1961	RCP			30	149	4.66	4.44	0.00148	17.80	13.14	21.00	16.56
NUN05P0012	South Frontage Road	1961	RCP			30	53	5.00	4.66	0.00642	18.00	13.00	17.80	13.14
NUN05P0014	South Frontage Road	1961	RCP			30	22	5.75	5.00	0.03409	18.20	12.45	18.00	13.00
NUN03P0258	Hospital Parking Area	1873	Brick	20	30	25	187	12.05	5.75	0.03369	25.00	12.95	18.20	12.45
NUN03P0257	Hospital Parking Area	1873	Brick	20	30	25	275	21.18	12.05	0.03320	38.50	17.32	25.00	12.95
NUN03P0256	Hospital Parking Area	1873	Brick	20	30	25	147	22.50	21.18	0.00898	39.40	16.90	38.50	17.32
NUN03P0255	Hospital Parking Area	1873	Brick	20	30	25	8	26.21	22.50	0.46375	39.40	13.19	39.40	16.90
NUN03P0187	Hospital Parking Area	1873	Brick	20	30	25	80	28.05	26.21	0.02300	40.00	11.95	25.00	-1.21

ATTACHMENT 11

GNHWPCA - NPDES Status CSO OUTFALLS

NPDES #	Regulator Location	Receiving Water	Latitude	Longitude Status	Current
003	E.T. Grasso Boulevard @ Orange Av	West River	41°17'50.171"N	72°57'1.984"W	Active
004	E.T. Grasso Boulevard @ Legion Av	West River	41°18'20.067"N	72°57'13.518"W	Active
005	E.T. Grasso Boulevard @ Derby Av	West River	41°18'36.579"N	72°57'15.769"W	Active
005 (A)	University Place	West River	41°18'36.579"N	72°57'15.769"W	Active
005 (B)	Elm/University Place	West River	41°18'36.579"N	72°57'15.769"W	Active
006	Whalley Av @ Fitch St	West River	41°19'30.292"N	72°57'26.302"W	Active
008	Munson St @ Orchard St	Mill River	41°19'28.364"N	72°56'15.601"W	Active
009	Grande Av @ James St	Mill River	41°18'30.553"N	72°54'21.301"W	Active
010	East St @ I-91 (2 Weirs/2 Regulators)	Mill River	41°18'51.599"N	72°54'31.317"W	Active
010 (A)	East St @ I-91 (2 Weirs/2 Regulators)	Mill River	41°18'51.779"N	72°54'33.15"W	Active
011	Humphrey St @ I-91	Mill River	41°18'47.975"N	72°54'26.313"W	Active
012	Mitchell Dr east of Nicoll St	Mill River	41°19'21.732"N	72°54'21.829"W	Active
013	Everitt St @ East Rock Rd	Mill River	41°19'49.392"N	72°54'32.936"W	Active
013(A)	East Rock Rd @ Everitt St	Mill River	41°19'49.683"N	72°54'33.789"W	Active
014	Trumbull St @ Orange St	Mill River	41°18'47.975"N	72°54'26.313"W	Active
015	James St Siphon	Quinnipiac River	41°18'3.559"N	72°54'7.658"W	Active
016	Poplar St @ River St	Quinnipiac River	41°18'6.472"N	72°53'45.738"W	Active
019	Pine St @ North Front St	Quinnipiac River	41°18'47.941"N	72°53'14.377"W	Active
020	Quinnipiac Av @ Clifton St	Quinnipiac River	41°18'35.997"N	72°53'8.299"W	Active
021	East St Pump Station	New Haven Harbor	41°17'49.235"N	72°54'38.727"W	Active
021 (A)	Chapel/Hamilton	New Haven Harbor	41°17'49.235"N	72°54'38.727"W	Active
024	Boulevard Pump Station (Sea St)	New Haven Harbor	41°16'58.072"N	72°55'30.522"W	Active
025	Union Pump Station (Union & State St)	New Haven Harbor	41°17'45.066"N	72°54'58.338"W	Active
025 (A)	Elm/University Place	New Haven Harbor	41°17'45.063"N	72°54'58.333"W	Active
025 (B)	Grove/Whitney	New Haven Harbor	41°17'45.063"N	72°54'58.333"W	Active
026	Humphrey Pump Station	Mill River	41°18'48.153"N	72°54'29.399"W	Active
027	East/Ives	Mill River	41°18'19.535"N	72°54'28.408"W	Active
028	Mitchell Pump Station	Mill River	41°19'22.381"N	72°54'23.908"W	Active
031	S. Frontage/Davenport	New Haven Harbor	41°17'45.066"N	72°54'58.338"W	+ Active
032	Port Sea/Liberty	New Haven Harbor	41°17'45.066"N	72°54'58.338"W	+ Active
033	Carlisle/Liberty	New Haven Harbor	41°17'45.066"N	72°54'58.338"W	+ Active
034	George/Temple	New Haven Harbor	41°17'45.066"N	72°54'58.338"W	Active
	Greene St	New Haven Harbor	41°17'48.7"N	72°54'48.022"W	Active
	Middletown/Front	Quinnipiac River	41°19'15.21"N	72°53'25.754"W	Active

NOTES: - All Latitudes and Longitudes are given where the pipe meets the receiving waters.
 - The final conveyance pipe at point of discharge may be considered a storm drain or a sanitary pipe.
 - The ultimate outfall pipe may also have a separate storm drain outfall NPDES number associated with it.
 + Active - These Cross Connections are believed to be closed. Performing Inspections & obtaining documentation.

**GREATER NEW HAVEN WPCA
CSO FLOW MONITORING PROGRAM
METER LOCATION SUMMARY
APRIL 2, 2014**

OF-006 SEWER, OVERFLOW AA AND OVERFLOW BB

- Meter OF-006 Sewer was installed in the 36 inch sewer upstream of the two overflow pipes on 6/4/12 at an invert elevation of 8.25 (overflow depth is 27 inches)
- Meters OF-006 Overflows AA and BB were installed in the twin 24 inch overflow pipes on 7/30/12 at an invert elevation of 10.54
- CSO start and stop times are based on a depth greater than 27 inches at Meter OF-006 Sewer and positive velocities at Meters OF-006 Overflows AA and BB
- CSO volumes are calculated based on depths and velocities at Meters OF-006 Overflows AA and BB, the hydraulic elements chart and the Continuity Equation

OF-005 SEWER AND OVERFLOW

- Meter OF-005 Sewer was installed in the 57 inch high by 60 inch wide sewer at REG 005 6/7/12 at an elevation of 5.44 (5 inches above the invert due to sediment) (overflow depth is 53.5 inches)
- Meter OF-005 Overflow was installed in the 48 inch overflow pipe on 6/7/12 at an invert elevation of 8.40 downstream of the 36 inch drain connection
- Meter OF-005 Overflow was reinstalled in the 48 inch overflow pipe on 11/17/13 at an invert elevation of 8.40 upstream of the 36 inch drain connection
- CSO start and stop times are based on a depth greater than 53.5 inches at Meter OF-005 Sewer and positive velocities at Meter OF-005 Overflow
- CSO volumes are calculated based on depths and velocities at Meter OF-005 Overflow, the hydraulic elements chart and the Continuity Equation

OF-004 SEWER AND OVERFLOW

- Meter OF-004 Sewer was installed in the 64 inch high by 72 inch wide sewer downstream of REG 004 6/6/12 at an invert elevation of 4.05 (overflow depth is 35 inches)
- Meters OF-004 Overflow was installed in the 3 foot high by 5 foot wide box culvert overflow on 6/6/12 at an invert elevation of 4.81
- The regulator consists of three weirs, each two feet wide
- CSO start and stop times are based on a depth greater than 35 inches at Meter OF-004 Sewer and positive velocities at Meter OF-004 Overflow
- CSO volumes are calculated based on depths and velocities at Meter OF-004 Overflow, the hydraulic elements chart and the Continuity Equation

OF-003 SEWER AND OVERFLOW

- Meter OF-003 Sewer was installed in the 64 inch high by 72 inch wide sewer downstream of REG 003 on 6/5/12 at an invert elevation of 2.39 (overflow depth is 46 inches)
- Meter OF-003 Overflow was installed in the 54 inch overflow pipe on 6/5/12 at an invert elevation of 2.75
- The regulator consists of an 5 foot long transverse weir
- CSO start and stop times are based on a depth greater than 46 inches at Meter OF-003 Sewer and positive velocities at Meter OF-003 Overflow
- CSO volumes are calculated based on depths and velocities at Meter OF-003 Overflow, the hydraulic elements chart and the Continuity Equation
- There is significant tidal influence at Meter OF-003 Overflow
- In order to account for the tidal depths being included in the CSO volume calculations, it is proposed to use the depths measured at Meter OF-003 Sewer when they exceed the weir elevation, the hydraulic elements chart and the Continuity Equation
- An alternative would be to use the depths measured at Meter OF-003 Sewer when they exceed the weir elevation and the weir formula

GNH1 SEWER AT TRUMAN TANK

- Meter GNH1 Sewer was installed in the 64 inch high by 72 inch wide sewer downstream of the Truman Tank Diversion Chamber on 6/12/12 at an invert elevation of 1.29 (there is 14 inches of hard packed sediment in the Diversion Chamber) (overflow depth is 36 inches)
- The regulator is a 10 foot bending weir
- The SCADA system measures depths in each cell of the 5 MG tank
- Truman Tank activation start and stop times are based on a depth greater than 36 inches at Meter GNH1 Sewer and SCADA depths in the Truman Tank
- CSO volumes are calculated based on SCADA depths in the Truman Tank

OF-024 US and DS SEWER AND REG 024 WEIR

- Meter OF-024 US Sewer was installed in the 69 inch high by 84 inch wide sewer upstream of REG 024 on 7/30/12 at an invert elevation of -1.17 (overflow depth is 65 inches)
- Meter OF-024 DS Sewer was installed in the 48 inch sewer downstream of REG 024 on 7/30/12 at an invert elevation of -2.72 (overflow depth is 81 inches)
- Meter 024 Weir was installed to measure weir depth at REG 024 on 10/31/12 at the weir elevation of 4.40
- The regulator consists of three weirs each 4.5 feet wide
- CSO start and stop times are based on depths greater than 65 inches at Meter OF-024 US Sewer, depths greater than 81 inches at Meter OF-024 DS Sewer (verified by the Meter 024 Weir depths)
- CSO volumes are calculated based on the weir elevation and the weir formula

OF-025 OVERFLOW - (THIS METER WAS REMOVED IN SEPTEMBER 2013)

- Meter OF-025 Overflow was installed in REG 025 on 12/12/12 at an invert elevation of 4.65 (overflow depth is 21 inches)
- The regulator consists of a 45 inch wide weir at elevation 6.40
- CSO start and stop times are based on a depth greater than 21 inches at REG 025
- CSO volumes are calculated based on depth over the 45 inch weir at REG 025 using the weir formula

REG 025 (METERS State, Frontage, Union and DS) (CSO 025)

- Four meters were installed in September 2013 to estimate CSOs at REG 025
- Meter State was installed in the 48 inch wide by 60 inch high sewer on State Street upstream of REG 025 at an invert of 4.92
- Meter Frontage was installed in the 30 inch sewer on North Frontage Road upstream of REG 025 at an invert of 3.00
- Meter Union was installed in the 36 inch sewer on State Street upstream of REG 025
- Meter Union was moved to the 30 inch sewer on Columbus Avenue in November 2013 at an invert of -0.73
- Meter REG 025 DS was installed in the 42 inch discharge pipe downstream of REG 025 and the State/Union Pump Station
- Meter REG 025 DS was moved to REG 025 in November 2013. Sensors are metering the depths on each side of the overflow weir
- CSO or stormwater inflow start and stop times are estimated based on the depths at the overflow weir
- CSO or stormwater inflow volumes are estimated using the weir formula

REG 034 SEWER AND OVERFLOW – (THIS METER WAS REMOVED IN SEPTEMBER 2013)

- Meter REG-034 Sewer was installed in the 48 inch sewer at REG 034 on 3/27/13 at an invert elevation of 11.45 (overflow depth is 15 inches)
- Meter REG-034 Overflow was installed on the overflow weir on 3/27/13
- The regulator consists of a 78 inch weir at elevation 12.70
- CSO start and stop times are based on a depth greater than 15 inches at REG 034
- CSO volumes are calculated based on depth over the 78 inch weir at REG 034 using the weir formula

REG 034 (METERS Temple, George, and DS) (CSO 025)

- Three meters were installed in September 2013 to estimate CSOs at REG 034
- Meter Temple was installed in the 25 inch wide by 37 inch high sewer on Temple Street upstream of REG 034
- Meter George was installed in the 36 inch wide by 48 inch high sewer on George Street upstream of REG 034
- Meter REG 034 DS was installed in the 24 inch discharge pipe downstream of REG 034

- Meter REG 034 DS was moved to REG 034 in November 2013. Sensors are metering the depths on each side of the overflow weir
- CSO or stormwater inflow start and stop times are estimated based on the depths at the overflow weir
- CSO or stormwater inflow volumes are estimated using the weir formula

OF-013 SEWER AND OVERFLOW – (THIS METER WAS REMOVED IN SEPTEMBER 2013)

- Meter OF-013 Sewer was installed in the 30 inch high by 45 inch wide sewer at REG 013 on 3/15/13 at an invert elevation of 20.20 (overflow depth is 25 inches)
- Meter OF-013 Overflow was installed on the overflow weir on 3/15/13
- The regulator is a 25 inch wide weir
- CSO start and stop times are based on a depth greater than 25 inches at REG 013
- CSO volumes are calculated based on depth over the 25 inch weir at REG 013 using the weir formula
- We plan to close OF-013 during FY13 as recommended in the CSO LTCP

OF-012 OVERFLOW A AND B

- Meters OF-012 Overflows A and B were installed in the twin 18 inch overflow pipes on 10/15/12 at an invert elevation of 14.20 (overflow depth in the 48 inch sewer is only 36 inches)
- The 36 inch by 55 inch sewer downstream of REG 012 is a hydraulic bottleneck
- Spring flows from the Mill River Trunk Sewer in Hamden contain significant amounts of I/I
- New 6 inch high weirs were installed in each 18 inch overflow pipes on 5/3/13 raising the overflow depth to 42 inches
- CSO start and stop times at REG 012 are based on positive velocities at Meters OF-012 Overflows A and B
- CSO volumes at REG 012 are calculated based on depths and velocities at Meters OF-012 Overflows A and B, the hydraulic elements chart and the Continuity Equation
- Total CSO volumes from CSO 012 are estimated by summing the CSO volumes from REG 012 and REG 028

REG 028 AT MITCHELL DRIVE PUMP STATION

- Regulator 028 is a 15 inch overflow pipe from the Mitchell Drive PS wetwell to CSO 012
- The SCADA system monitors the depth in the wetwell
- No overflows occurred in 2012 (including the 5 year storm on 9/28/12) or 2013
- Plan is to replace the pumps with grinder pumps, add an emergency generator receptacle, and then close REG 028

OF-010 SEWER

- Meter OF-010 Sewer was installed in the 54 inch sewer at REG 010/010A on 12/20/12 at an invert elevation of 8.47 (overflow depth is 57 inches)
- The regulator is a 46 inch wide weir

- CSO start and stop times are based on a depth greater than 57 inches at REG 010/010A
- CSO volumes are calculated based on depth over the 46 inch weir at REG 010/010A using the weir formula
- We plan to close CSO 010 during FY13 as recommended in the CSO LTCP

REG 010A (CSO 011)

- Meter REG 010A was installed in the 54 inch sewer at REG 010A on 12/20/12 at an invert elevation of 8.47 (overflow depth is 62 inches)
- The regulator is a 114 inch wide weir
- CSO start and stop times at REG 010A are based on a depth greater than 62 inches at Meter REG 010A
- CSO volumes at REG 010A are calculated based on depth over the 114 inch weir at REG 010A using the weir formula

REG 014 SEWER AND OVERFLOW (CSO 011) – (THIS METER WAS REMOVED IN SEPTEMBER 2013)

- Meter REG 014 Overflow was installed on the weir in the 48 inch overflow pipe on 10/3/12
- Meter OF-014 Sewer was installed in the 66 inch sewer at REG 014 on 12/20/12 at an invert elevation of 12.40 (overflow depth is 54 inches)
- The regulator is a 44 inch wide weir
- CSO start and stop times are based on a depth greater than 54 inches at REG 014
- CSO volumes are calculated based on depth over the 44 inch weir at REG 014 using the weir formula
- We plan to close REG 014 during FY13 based on the metering data which confirmed that completion of Phase 1 of the Yale/Trumbull separation project eliminated the need for REG 014

REG 011 (METERS OF-011-997, 609, 631 AND 819) (CSO 011)

- Four meters were installed in December 2012 to estimate CSOs at REG 011
- Meter OF-011-997 was installed in the 30 inch sewer on State Street upstream of the 42 inch discharge pipe— **(THIS METER WAS REMOVED IN SEPTEMBER 2013)** Metered flows were very consistent and relatively small
- Meter OF-011-609 was installed in the 37 inch wide by 25 inch high sewer on Humphrey Street upstream of REG 011— **(THIS METER WAS REMOVED IN SEPTEMBER 2013)** Metered flows were very consistent and relatively small
- Meter OF-011-631 was installed in the 66 inch sewer on State Street upstream of REG 011
- Meter OF-011-819 was installed in the 42 inch discharge pipe downstream of REG 011 and Meter O-011997
- CSO start and stop times at REG 011 are estimated by summing the flows from the one upstream meter and subtracting the flows from the downstream meter (anytime the resultant flow is greater than zero a CSO is occurring)
- CSO volumes from REG 011 are estimated using the resultant flows as calculated above

- Total CSO volumes from CSO 011 are estimated by summing the CSO volumes from REG 010A, REG 011 and REG 026

REG 026 AT HUMPHREY STREET PUMP STATION

- Regulator 026 is a 10 inch overflow pipe from the Humphrey Street PS wetwell to CSO 011
- The SCADA system monitors the depth in the wetwell
- No overflows occurred in 2012 (including the 5 year storm on 9/28/12) or 2013
- Plan is to replace the pumps and then close the REG 026

OF-GREENE SEWER AND OVERFLOW – (THIS METER WAS REMOVED IN SEPTEMBER 2013)

- Meter OF-Greene Overflow was installed in REG Greene on 8/15/12 at an invert elevation of 5.72 (overflow depth is 72 inches)
- Meter OF-Greene Sewer was installed in the 24 inch sewer at REG Greene on 3/25/13 at an invert elevation of 5.72 (overflow depth is 72 inches)
- The regulator is a 15 inch pipe
- CSO start and stop times are based on a depth greater than 72 inches at REG Greene
- CSO volumes are calculated based on depth over the 72 inches at REG Greene using the hydraulic elements chart and the Continuity Equation
- We plan to close OF-GREENE during FY13 based on the metering data which confirmed that following completion of the separation work upstream of REG Greene that CSO Greene is no longer needed

REG 021-OF AND OF-021 US SEWER (E ST PS SEWER)

- Meter OF-021 US Sewer (E St PS) was installed in the 62 inch wide by 67 inch high sewer upstream of REG 021 on 9/13/12 at an invert elevation of 0.10 (overflow depth is 75 inches)
- Meter OF-021 was installed in REG 021 on 11/15/12 at an invert elevation of -0.97 (overflow depth is 88 inches)
- The regulator is twin 84 inch wide steel plate weirs at elevation 6.34
- There is a duckbill on the overflow pipe
- CSO start and stop times are based on a depth greater than 88 inches at REG 021
- CSO volumes are calculated based on depth over the twin 84 inch weirs at REG 021 using the weir formula

OF-009 OVERFLOW

- Meter OF-009 Overflow was installed in the 30 inch wide by 45 inch high overflow pipe on 10/3/12 at an invert elevation of 3.50
- The regulator consists of an 5.5 foot long weir at an elevation of 5.70
- CSO start and stop times are based on a positive velocities at Meter OF-009 Overflow
- CSO volumes are calculated based on depths and velocities at Meter OF-009 Overflow, the hydraulic elements chart and the Continuity Equation
- There is significant tidal influence at Meter OF-009 Overflow (no duckbill)

- Unlike OF-003, there is not a meter in the sewer to use an alternative check on Meter OF-009 Overflow
- Some sort of manual depth deduction could be possible if CSOs happen coincident with tides

OF-015 US and DS SEWERS

- Meter OF-015 US Sewer was installed in the 45 inch sewer upstream of REG 015 on 10/3/12 at an invert elevation of -0.16
- Meter OF-015 DS Sewer was installed in the 48 inch sewer to the James Street siphon inlet downstream of REG 015 on 10/3/12 at an invert elevation of -1.10 (overflow depth is 40.5 inches)
- The James Street siphon was designed with a capacity of 24 MGD
- The regulator consists of a 7 foot long concrete weir at elevation 2.27
- CSO start and stop times are based on depths greater than 40.5 inches at Meter OF-015 DS Sewer (difficult to estimate small CSOs)
- Velocities at Meters OF-015 US and DS drop from over 2 fps to under 1 fps during CSO events
- CSO volumes are calculated by subtracting the Meter 015 DS Sewer flows from the Meter 015 US Sewer flows

OF-016 OVERFLOW

- Meter OF-016 Overflow was installed in the 48 inch wide by 60 inch high overflow pipe on 8/30/12 at an invert elevation of 0.90
- The regulator consists of an 3.8 foot long weir at an elevation of 3.40
- CSO start and stop times are based on a positive velocities at Meter OF-016 Overflow
- CSO volumes are calculated based on depths and velocities at Meter OF-016 Overflow, the hydraulic elements chart and the Continuity Equation
- There is significant tidal influence at Meter OF-016 Overflow (even though there is a duckbill)
- Unlike OF-003, there is not a meter in the sewer to use an alternative check on Meter OF-016 Overflow
- Some sort of manual depth deduction could be possible if CSOs happen coincident with tides

OF-019 OVERFLOW

- Meter OF-019 Overflow was installed in the 24 inch overflow pipe on 8/13/12 at an invert elevation of 4.80
- The regulator consists of twin 15 inch overflow pipes at an elevation of 6.50
- CSO start and stop times are based on a positive velocities at Meter OF-019 Overflow
- CSO volumes are calculated based on depths and velocities at Meter OF-019 Overflow, the hydraulic elements chart and the Continuity Equation
- There is significant tidal influence at Meter OF-019 Overflow (no duckbill)
- Unlike OF-003, there is not a meter in the sewer to use an alternative check on Meter OF-019 Overflow
- Some sort of manual depth deduction could be possible if CSOs happen coincident with tides

OF-020 SEWER AND OVERFLOW

- Meter OF-020 Overflow (depth sensor) was installed in the 15 inch overflow pipe at REG 021 on 3/25/13 at an invert elevation of 13.95
- Meter OF-020 Sewer was installed in the 24 inch sewer at REG 021 on 3/25/13 at an invert elevation of 11.50 (overflow depth is 30 inches)
- The regulator is a 15 inch pipe
- CSO start and stop times are based on a depth greater than 30 inches at REG-021
- CSO volumes are calculated based on depth over the 30 inches at REG-021 using the hydraulic elements chart and the Continuity Equation

**GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY
REGULATOR AND CSO DESIGNATIONS AND STATUS**

TABLE 11-1

(1) NPDES CSO #	(1) NPDES REGULATOR LOCATION	(1) NPDES CSO RECEIVING WATER	(1) NPDES CSO STATUS	(2) CSO #	(2) CSO STATUS	(2) REG #	(2) REG STATUS
#003	E.T. Grasso Boulevard @ Orange Av	West River	Active	#003	Active	#003	Weir replaced in 2012
#004	E.T. Grasso Boulevard @ Legion Av	West River	Active	#004	Active	#004	Weir to be raised 8 inches in 2014
#005	E.T. Grasso Boulevard @ Derby Av	West River	Active	#005	Active	#005	Active
#005 (A)	University Place	West River	Active	None	Closed prior to 2008	None	Closed prior to 2008
#005 (B)	Elm/University Place	West River	Active	None	Closed prior to 2008	None	Closed prior to 2008
#006	Whalley Av @ Fitch Street	West River	Active	#006	Active	#006	Active
#008	Munson St @ Orchard St	Mill River	Active	#008	To be closed in 2014	#008	To be closed in 2014
#009	Grande Av @ James St	Mill River	Active	#009	Active	#009	Weir replaced in 2012
#010	East St @ I-91 (2 Weirs/2 Regulators)	Mill River	Active	#010	To be closed in 2014	#010	To be closed in 2014
#010 (A)	East St @ I-91 (2 Weirs/2 Regulators)	Mill River	Active	#011	Active	#010 (A)	Active
#011	Humphrey St @ I-91	Mill River	Active	#011	Active	#011	Active
#012	Mitchell Dr east of Nicoll St	Mill River	Active	#012	Active	#012	Weir raised 6 inches in 2013
#013	Everitt St @ East Rock Rd	Mill River	Active	#013	To be closed in 2014	#013	To be closed in 2014
#013 (A)	East Rock Rd @ Everitt St	Mill River	Active	None	Closed prior to 2008	None	Closed prior to 2008
#014	Trumbull St @ Orange St	Mill River	Active	#011	Active	#014	To be closed in 2014
#015	James St Siphon	Quinnipiac River	Active	#015	Active	#015	Active
#016	Poplar St @ River St	Quinnipiac River	Active	#016	Active	#016	Active
#019	Pine St @ North Front St	Quinnipiac River	Active	#019	Active	#019	Active
#020	Quinnipiac Av @ Clifton St	Quinnipiac River	Active	#020	Active	#020	Active
#021	East St Pump Station	New Haven Harbor	Active	#021	Active	#021	Active
#021 (A)	Chapel/Hamilton	New Haven Harbor	Active	None	Closed prior to 2008	None	Closed prior to 2008
#024	Boulevard Pump Station (Sea St)	New Haven Harbor	Active	#024	Active	#024	Active
#025	Union Pump Station (Union & State St)	New Haven Harbor	Active	#025	Active	#025	Weir to be repaired in 2014
#025 (A)	Elm/University Place	New Haven Harbor	Active	None	Closed prior to 2008	None	Closed prior to 2008
#025 (B)	Grove/Whitney	New Haven Harbor	Active	None	Closed prior to 2008	None	Closed prior to 2008
#026	Humphrey Pump Station	Mill River	Active	#011	Active	#026	Active
#027	East/Ives	Mill River	Active	None	Closed prior to 2008	None	Closed prior to 2008
#028	Mitchell Pump Station	Mill River	Active	#012	Active	#028	Active
#031	S. Frontage/Davenport	New Haven Harbor	Active	None	Closed in 2013	None	Closed in 2013
#032	Port Sea/Liberty	New Haven Harbor	Active	#025	Active	#032	To be closed in 2014
#033	Carlisle/Liberty	New Haven Harbor	Active	None	Closed prior to 2008	None	Closed prior to 2008
#034	George/Temple	New Haven Harbor	Active	#025	Active	#034	Weir to be raised 2 feet in 2014
	Greene St	New Haven Harbor	Active	Greene	To be closed in 2014	Greene	To be closed in 2014
	Middletown/Front	Quinnipiac River	Active	None	Closed prior to 2008	None	Closed prior to 2008
(1) NPDES Permit # CT 0100366 dated January 25, 2011							
(2) Ongoing CSO Flow Monitoring Program initiated in June 2012							

GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY

CSO FLOW MONITORING PROGRAM

METER DATA SUMMARY - 2013

TABLE 11-2

<u>CSO NUMBER</u>	<u>REGULATOR NUMBERS</u>	<u>CSO EVENTS</u>	<u>MINIMUM CSO RETURN PERIOD</u>	<u>CSO VOLUME (MG)</u>	<u>RAINFALL (IN)</u>	<u>METER MONTHS</u>
CSO 006	REG 006	12	< 1 Month	3.503	36.09	12
CSO 005	REG 005	9	1 Month	1.973	36.09	12
CSO 004	REG 004	39	< 1 Month	11.915	36.09	12
CSO 003	REG 003	30	< 1 Month	18.430	36.09	12
CSO 024	REG 024	7	1 Month	6.243	36.09	12
CSO 009	REG 009	26	< 1 Month	2.123	36.09	12
CSO 019	REG 019	8	< 1 Month	0.183	36.09	12
CSO 016	REG 016	26	< 1 Month	10.766	36.09	12
CSO 015	REG 015	19	< 1 Month	2.194	36.09	12
CSO 010	REG 010	4	6 Month	1.227	36.09	12
CSO 011	REGS 010A, 011, 014, 026	10	1 Month	6.097	36.09	12
CSO 012	REGS 012A, 012B, 028	18	< 1 Month	10.313	36.09	12
CSO GREENE	REG GREENE	0	> 5 Year	0.000	28.38	8
CSO 025	REGS 025, 034	0	> 6 Month	0.000	4.33	1
CSO 021	REG 021	17	< 1 Month	19.960	36.09	12
CSO 013	REG 013	7	< 1 Month	0.170	23.11	6
CSO 020	REG 020	2	6 Month	0.039	30.81	10
TOTAL		234		95.136		

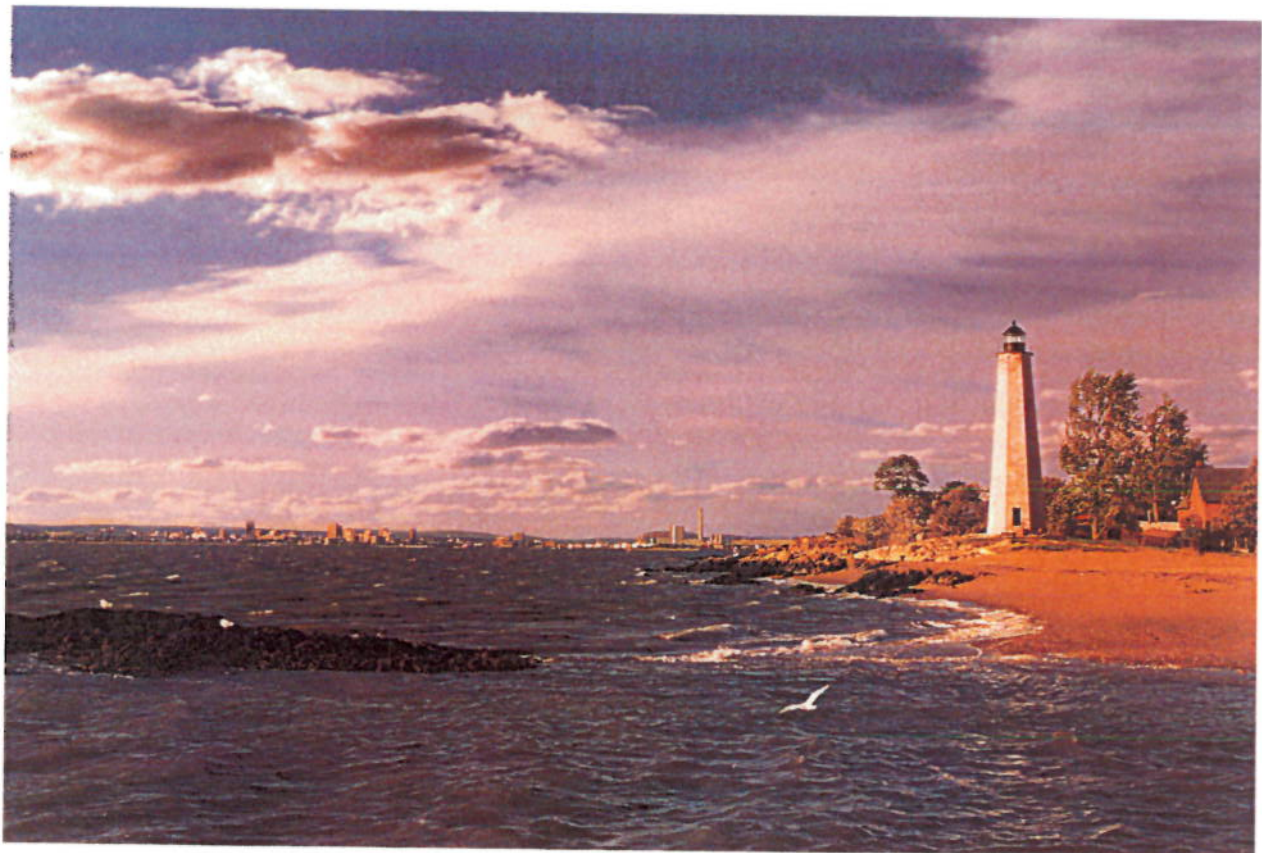
ATTACHMENT 12

GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY

CLOSED CSOs AND REGULATORS

TABLE 12-1

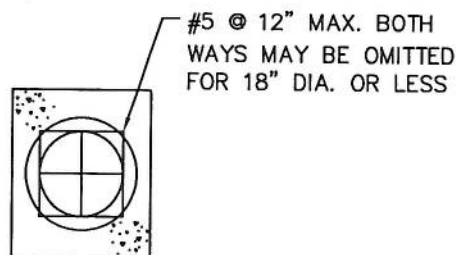
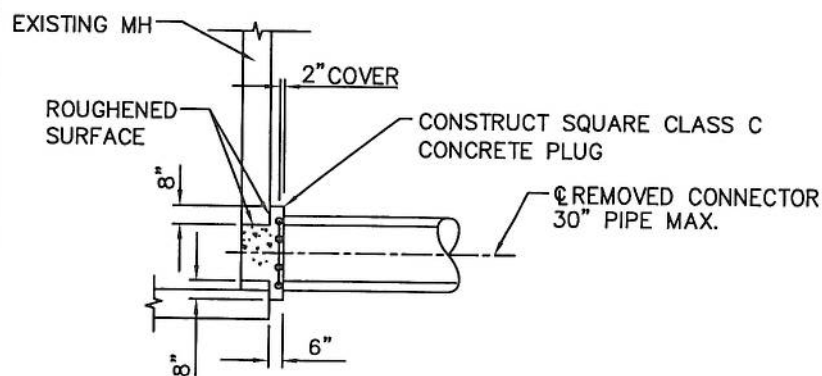
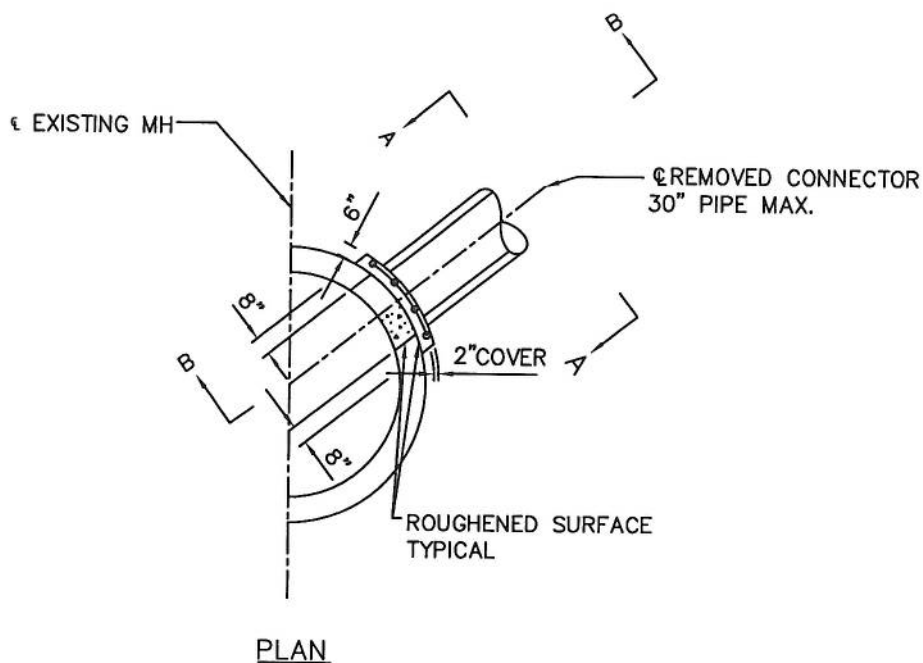
<u>(1) NPDES CSO #</u>	<u>(1) NPDES REGULATOR LOCATION</u>	<u>(1) NPDES CSO RECEIVING WATER</u>	<u>(1) NPDES CSO STATUS</u>	<u>(2) CSO #</u>	<u>(2) CSO STATUS</u>	<u>(2) REG #</u>	<u>(2) REG STATUS</u>
#002	E.T. Grasso Boulevard @ Lamberton St	West River	Closed	None	Closed prior to 2008	None	Closed prior to 2008
#005 (A)	University Place	West River	Active	None	Closed prior to 2008	None	Closed prior to 2008
#005 (B)	Elm/University Place	West River	Active	None	Closed prior to 2008	None	Closed prior to 2008
#007	Munson St @ Canal St	Mill River	Closed	None	Closed prior to 2005	None	Closed prior to 2005
#013 (A)	East Rock Rd @ Everitt St	Mill River	Active	None	Closed prior to 2008	None	Closed prior to 2008
#017	Grand Av @ Front St	Quinnipiac River	Closed	None	Closed prior to 2005	None	Closed prior to 2005
#018	Lombard St @ North Front St	Quinnipiac River	Closed	None	Closed prior to 2008	None	Closed prior to 2008
#021 (A)	Chapel/Hamilton	New Haven Harbor	Active	None	Closed prior to 2008	None	Closed prior to 2008
#022	Allen Place	New Haven Harbor	Closed	None	Closed prior to 2008	None	Closed prior to 2008
#023	Chestnut St @ Water St	New Haven Harbor	Closed	None	Closed prior to 2005	None	Closed prior to 2005
#025 (A)	Elm/University Place	New Haven Harbor	Active	None	Closed prior to 2008	None	Closed prior to 2008
#025 (B)	Grove/Whitney	New Haven Harbor	Active	None	Closed prior to 2008	None	Closed prior to 2008
#027	East/Ives	Mill River	Active	None	Closed prior to 2008	None	Closed prior to 2008
#029	Barnes Pump Station	Quinnipiac River	Closed	None	Closed prior to 2008	None	Closed prior to 2008
#030	Quinnipiac Pump Station	Quinnipiac River	Closed	None	Closed prior to 2008	None	Closed prior to 2008
#031	S. Frontage/Davenport	New Haven Harbor	Active	None	Closed in 2013	None	Closed in 2013
#033	Carlisle/Liberty	New Haven Harbor	Active	None	Closed prior to 2008	None	Closed prior to 2008
#035	Woodward Pump Station	New Haven Harbor	Closed	None	Closed prior to 2008	None	Closed prior to 2008
	Middletown/Front	Quinnipiac River	Active	None	Closed prior to 2008	None	Closed prior to 2008
	State/James	Mill River	Closed	None	Closed prior to 2008	None	Closed prior to 2008
(1) NPDES Permit # CT 0100366 dated January 25, 2011							
(2) Ongoing CSO Flow Monitoring Program initiated in June 2012							



GREATER NEW HAVEN Water Pollution Control Authority
Standard Construction Details

July 2013

GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY CONSTRUCTION DETAILS



PIPE PLUG AT MANHOLE
NTS

REVISIONS	
NO.	DATE
1	JUNE 2008